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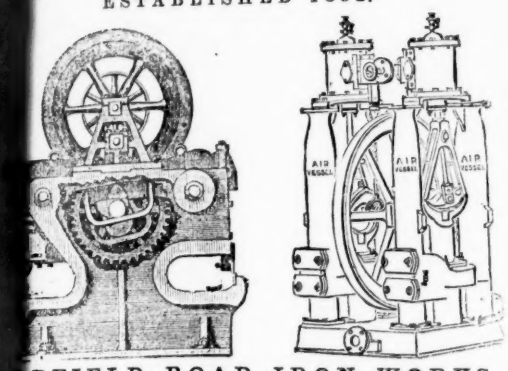

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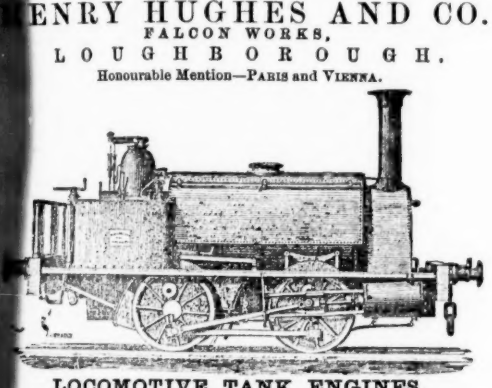

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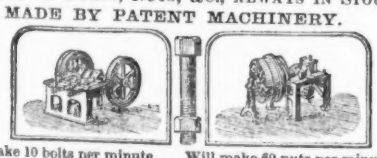

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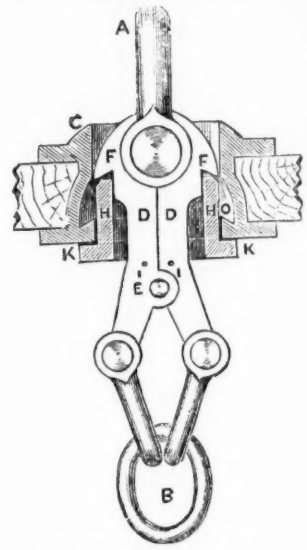

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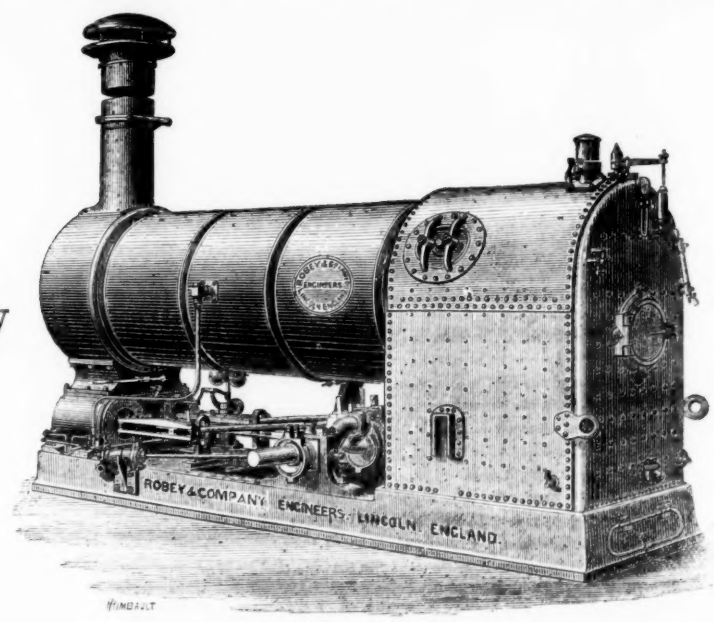

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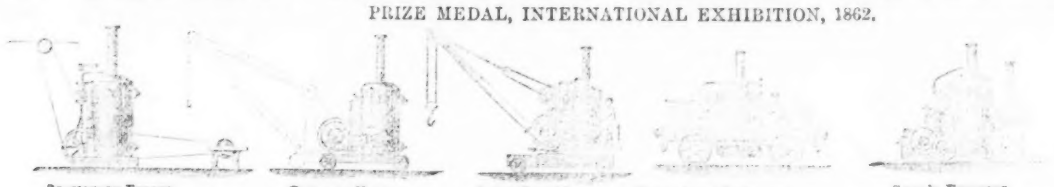

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ON COAL, AND COAL FIELDS.

By Mr. Ralph Moore, H.M. Inspector of Mines.

[Abstract of Paper read before the Literary Association of Eastfield, near Glasgow.]

INTRODUCTION.

Premising that he had consented to address the association on "Coal," Mr. Moore said that he did not propose to treat of the winning and working of coal, that being a subject with which most of his audience were familiar. He proposed to speak of the occurrence of coal in the stratified deposits; of the theory of its formation; of some of the different qualities of coal; of the countries in which it had been found—its distribution; and to refer more particularly to the Scotch coal field, and to the Lanarkshire division of the field. We had become so much accustomed to the presence of coal—it was so constantly before us—that we seldom thought of the great part it had played in the earth's history; and yet, to his thinking, there was no more interesting subject for enquiry than that of the occurrence of the coal deposits.

GEOLOGICAL POSITION OF COAL.

Assuming that his audience were aware that the crust of the globe consisted of earth, rocks, coal, and other minerals, and neglecting the variable and irregular covering of soil, he said the rocks were found lying one upon another in regular layers, and generally dipping in a given direction. Thus, the freestone rock of the Eastfield Quarry was seen cropping up to the surface and dipping toward the village of Eastfield. Again, those who were miners knew that the rocks lay in regular succession. They need not look for the Ell coal under the Main coal, nor the Main coal under the splint. If they got the Ell coal they expected to find the others under it at the proper distances. To take a still more familiar illustration—the rocks and minerals lay piled upon each other in regular sequence, like the books and chapters of the Bible from Genesis to the Revelations. There were, indeed, chapters and even books awanting in one place that are in another; but they never succeeded in finding the missing materials in preceding chapters. The lecturer explained what was meant by the science of geology, and said it was comparatively a new science, the word geology not being found in the first edition of the "Edinburgh Encyclopædia," published in 1797. Before that time, however, Werner, Hutton, and many others had studied the subject, and paved the way for greater discoveries. Since then, and especially in our own time, such great progress had been made by geologists in this and other countries that the relation of the rocks to each other was generally well known and understood. Geologists had arrived at the conclusion that the lowest crust of the earth yet seen—the Genesis, so to speak—was granite, such as might be seen in the pecks of Arran or Ben Nevis; and that the various rocks above it had been formed from the base by torrents which carried down mud and silt, which became deposited in quiet lakes forming mud and sand, to become, in turn, compressed into the various sandstones and shales now found. It was probable that it took millions of years to form the stratified deposits, and during that period animal and vegetable life existed, as was proved by the fossil remains found in them. In the lowest of the deposits there were found fishes; gradually on getting upwards the higher forms of reptiles and birds were found; and, lastly, man. The stratified deposits had been permeated and burst up by igneous rocks, such as whinstone, which raised and depressed them, and were, in fact, the prime movers in their formation. It was well known that a rapidly running river would carry with it immense quantities of the mud or sand which it found in its course, and that when the water got into a lake the mud held in suspension gradually settled down, and formed a deposit on the bottom of it, leaving only clear water. Such a deposit of mud or clay, now shale, gradually accumulated until the lake filled, when another depression of the earth took place, and the torrents charged with sand formed sandstone, and so the process was repeated until the whole formation was completed. Depressions and elevations were at present continually taking place on the face of the earth. For example, those places where there were coral reefs were gradually sinking, while those where there was volcanic action were gradually rising. During the period of the formation of the stratified deposits such forces were a greater importance than they were now, and the results were more perceptible. When some of the deposits so formed got above water, soil was formed—atmospheric influences were congenial.

FORMATION OF COAL.

The soil thus formed was favourable to the growth of plants, and the seeds carried about by the winds and waves took root, forests arose, and plants flourished, and it was from those forests that coal was derived. The first theory in regard to the formation of coal was that trees were washed down by large rivers, such as the Mississippi, and got water-logged and sank to the bottom, so forming the beds or seams of coal. But the theory was now supposed to be erroneous, as the seams of coal were of such an extent as to make it impossible for any amount of drift-wood to form them. Moreover, it would be difficult to reconcile the regularity with which the seams were found with the drift-wood theory. Peat bogs had also been put forward as the origin of coal; but the latest theory was that coal was merely a collection of vegetable matter gathered together from the fallen leaves, twigs, &c., from the trees which grew where the coal was now found. It had been observed that wherever coal was found there was almost always a [illegible] or "daugh," lying immediately below it, and forming where it is soft enough, or softer than the coal, the miners' "holeing." Trees had been found with their roots [illegible] pavement. They were familiar to the miners under the name of "dougars," and were pitted with small holes, which were the places from which the rootlets sprung; and from these facts it was conjectured that the trees had grown where they were actually found. Many of the audience had, doubtless, seen pieces of fossil trees—not coal, as they might imagine from the theory which the lecturer had given, but composed of stone with a rind of coal upon the outside. It was supposed that such fossil trees, which were generally found in the roofs, were trees which, after the vegetable matter forming the coal had been submerged, stuck up through the water and gradually decayed, not at the bark but in the centre. After all the heart had decayed, leaving only the bark, the hollow so formed got filled with mud or sand, and hence what was now seen as a fossil tree was, in fact, only a cast of the tree, the bark being the mould. This was proved by the fact that fossil shells had actually been found in the heart of a fossil tree. The pavement of the coal was merely the soil upon which the plants and trees which formed the coal grew. When one seam of coal was formed another depression of the surface took place, submerging it until in due time the surface appeared, vegetation recommenced, and another seam was formed. The varying distance between the adjacent seams of coal—for example, between the Pyotshaw and Main coal, sometimes 30 ft.—was accounted for by supposing a partial depression of the surface over a small area, while the forests were growing, and which was filled up by a deposit of mud. The trees which constituted the forests had been recognised by botanists from the fossil remains, and were said to belong to the club moss tribe, plants still occurring in Britain, but mere dwarfs as compared with the giants of the coal age. They now rarely reached a height, under the most favourable circumstances, of more than 4 ft., whereas during the carboniferous period they must, according to Prof. Williamson, have been 100 ft. high and 12 ft. in circumference. Trees of the pine tribe were also supposed to have formed coal. The variations in the quality of the different seams of coal, and in the same seam of coal, were all supposed to be due to different kinds of vegetable matter of which they were composed. Some kinds of coal when cut into thin slices and examined by the aid of the microscope were seen to contain the seeds and fruit of the trees, which were of a more combustible nature than the wood; and it was generally thought that further investigation in that direction would throw greater light on that very important subject. The comparative position of most coal fields in the world had been ascertained by the comparison of the fossils found in them; and the theory of coal being formed from wood, or woody plants, was further confirmed by its chemical composition, in illustration of which Mr. Moore mentioned Dr. Percy's analyses of wood, peat, lignite, Staffordshire coal, Tyne steam coal, South Wales coal, and anthracite, so far as the carbon, hydrogen, and oxygen were concerned.

THE DIFFERENT COAL FORMATIONS.

The first known coal formation was found in the Silurian rocks of the primary formation, in the county of Cavan, in Ireland; but no coal had been found in the same division in England. Above the Silurian rocks, and in the Devonian (of which the Scottish Highlands were mainly composed), the coal fields of New South Wales and Australia were found, but it was in the group lying immediately above the Devonian that the great carboniferous range was situated. In that range 95 per cent. of the whole coal in the world was contained, and it was from it that the supplies of Great Britain and the continents of Europe and America were obtained. Above the carboniferous formation, and in the Permian measures, the coal fields of India were found. The red sandstone seen at Mauchline, in Ayrshire, was part of the Permian formation, but it contained no seams of coal of workable thickness anywhere in Great Britain, or in either of the continents formerly mentioned. In some places coal occurred in the secondary formation. The Brora coal, in Sutherlandshire, was an example, and coal was also found in it in Yorkshire, Hungary, and South America. Such coal was called lignite, or wood coal, on account of its imperfect formation. Beds of lignite had also been found in the tertiary formation in various parts of Europe, and in some parts of Ireland, as in the county of Antrim. After showing that the stratified deposits were not always of their full extent at all places, that some of them were occasionally awanting, and that the notion entertained by some persons that coal could be found anywhere if it was only searched for was an erroneous one, the lecturer went on to say that his audience would see that the carboniferous system occupied a distinct place in the stratified deposits, and that the coal was found in a belt of those strata from 1000 to 2000 ft. in thickness. With the exception of small patches of the tertiary formation, which were found in the Island of Mull and in Sutherlandshire, there were no rocks in Scotland of later date than the red rock at Mauchline. Although coals had been found in some places above the carboniferous formation, yet for all practical purposes the latter formation was alone depended on.

DISTRIBUTION OF COAL.

In speaking on this part of his subject, and commencing with Great Britain (which had 12,000 square miles of coal), there were the Scotch coal field, extending from the Firth of Forth to the Firth of Clyde; the Newcastle coal field, the Yorkshire coal field, the Midland, South Wales, and Bristol coal fields. In Ireland there was not much coal. The carboniferous limestone underlying the coal measures extended over a large area, but there were few workable seams of coal in it. In France there was a narrow strip near Calais, and in Central France an area of 10,000 acres, with twenty seams, varying from 3 ft. to 16 ft. thick. The Belgian coal field was 300 miles long, and from 4 to 6 miles wide, and produced about 11,000,000 tons yearly. In Prussia there was a continuation of the coal field. There was also coal in Silesia and Westphalia, together with an area of brown coal or lignite. Saxony contained a considerable area of coal. Austria produced 8,000,000 tons yearly from her own deposits. Coal was contained in the Asturias in Spain, although the country was more famous for her deposits of iron ore, which were amongst the most magnificent in the world, as also for her copper and lead. Russia contained large coal beds, one field having an area of 13,000 square miles. America contained more coal than all the other parts of the world put together, and doubtless had a magnificent prospect before her in her mineral possessions. According to some geologists the area was twenty-one times larger than that of all the European coal fields together, but that estimate was probably overrated. However, it was certain that the amount of coal was enormous, and vastly larger than that contained in all the European coal fields. The British colonies of America, New Brunswick, and Nova Scotia were especially notable for a great thickness of coal. In the Cumberland coal field the coal-bearing strata were 14,000 ft. thick; it contained fossil plants of the same species as those found in the English coal fields. In Pictou there were 37½ ft. of coal. The United States were said to contain 196,850 square miles of coal (as against 12,000 miles in Britain), in five large districts:—1. The Appalachian—a series of productive basins in Pennsylvania, Ohio, Maryland, Virginia, Kentucky, and Tennessee—extending in a north-east and south-west direction for 875 miles, the coal being anthracitic in some places and bituminous in others, and one single seam being 40 ft. thick in some places.—2. The Illinois coal field, containing an area of 5000 square miles, and having in Western Kentucky 40 or 50 ft. of coal in nine workable seams.—3. The Iowa coal field, of upwards of 72,000 square miles in area.—4. The Texas coal field, 3000 square miles.—5. The Michigan coal field, 15,000 square miles in area. One had only to think that out of the British coal fields, 12,000 miles in area, 120,000,000 tons were raised yearly, and that out of the magnificent field only 20,000,000 tons were raised, in order to see what an immense future was in store for America in her coal. (Although it was rather anticipating, the lecturer remarked that it was calculated that the small area in Great Britain—small at compared with America—would supply 120,000,000 tons yearly for 300 years. The world need not, therefore, fear that its coal would be exhausted, even though it lasted thousands of years longer than the period assigned to it by Dr. Cumming.) Asia did not contain much coal as compared with its size. There were some coal fields on the south shores of the Black Sea. In India large tracts of coal had been found in Burdwan. China contained large deposits of coal, but they had not been much explored. Japan also contained coal. Borneo and Labuan had coal fields, which British capitalists had attempted to open up, but not hitherto with much success. Australia had a considerable development of coal field. In Sydney there were some large collieries, with the usual varieties of smithy, household, and gas coal, which were extensively shipped to San Francisco and other parts of the American continent. Tasmania and New Zealand contained coal, and large quantities of coal were found in South America, from Valparaiso to Chili, the latter being of the lignite kind, but still a useful coal. A short time ago the lecturer had the pleasure of seeing the plans of one of the South American collieries, which were shown to him by one of the managers. The collieries referred to were conducted on the English principle, and the machinery had all been sent from England. Put into a tabular form, the principal coal fields in the order of size were:—

The United States of America.....Square miles	133,132
British America	18,000
Great Britain.....	12,000
Russia	A very large area.
Spain	1,719
Belgium	519

Not only had America by far the largest area, but, doubtless, in future generations the output would be commensurate with its area. The output at present was not supposed to be more than 20,000,000 tons yearly, or about one sixth that of Great Britain—the relative output of coal throughout the world being approximately as follows:—

England and Wales.....Tons	108,000,000
Scotland	17,000,000
Ireland	120,000
Total of Great Britain and Ireland.....	125,000,000
Germany.....	30,000,000
Belgium	20,000,000
France	12,000,000
United States.....	20,000,000
Other countries.....	10,000,000
Total.....	217,000,000

So that Great Britain produced more coal than all the other countries put together. It was difficult to get an idea of a million tons of coal conveyed to the mind, and the lecturer tried to do so by saying that Glasgow Green, which was about 100 acres in area, would be covered 6 ft. deep by that quantity of coal; while the quantity raised in Scotland and England every year would form a bing 720 ft. in height—rather a high bing!

CONSUMPTION OF COAL.

In the year 1660 the coal produce of the United Kingdom appeared to have been only about 2½ million tons, and 40 years later the increase was only 364,000 tons. Nearly 5,000,000 tons were raised in 1750, and in 1800 the quantity exceeded 10,000,000 tons, as much now being raised in Lanarkshire as was raised in the whole kingdom 75 years ago. About the year 1800 the system of canal navigation was rapidly extending, and the result was that coals gradually found their way into new districts. In 1816 the production was 27,000,000 tons; in 1854, 64,500,000; in 1860, 80,000,000; in 1869, 107,000,000; in 1875, 126,000,000. As it might be interesting to view the quantity of coal in the light of the power which it was capable of giving out, the lecturer said that a steam-engine of average quality consumed 10 lbs. of coal per horse-power per hour, or it consumed 100 lbs. every day of ten hours, while it did the work of a horse. A ton of coal would supply a horse's power for 24 days, and the quantity of coal raised in Great Britain yearly being 125,000,000 tons, would supply the power of 10,000,000 horses, or 50,000,000 men. There were exported yearly 15,000,000 tons of coal, or as much as would supply the power of 6,000,000 men. Taking the consumption of coal at 12 tons for the power of five men, and the coals at 10s. per ton, the power of five men could be obtained for 6*l.* per year, or a man's power could be obtained for 25s. per year, 6d. per week, or a penny per day; and thus the quantity of coal raised in the United Kingdom was shown to be equal to an army of 50,000,000 men, [illegible] per annum for each person on an average there were about 300 tons of coal raised employed, so that every person employed in a coal mine furnished power equal to about 150 men. It was this power of creating cheap labour which enabled our manufacturers to compete with the world, and to send their productions throughout the whole inlets of the world, our power of creating cheap labour from our coal fields enabling us to outbid all others. Having made some remarks upon the prospective exhaustion of the British coal fields, and the labours of the Royal Commission of Inquiry on the Coal Supply, Mr. Moore went on to speak of—

THE SCOTCH COAL FIELD.

He said the coal measures of Scotland stretched from near St. Andrews through the Firth of Forth, and in a south-westerly direction into the Irish Channel, the area being about 80 miles in length by 40 miles at its greatest breadth. The coal-bearing strata were between 5000 and 6000 ft. in thickness, the first workable seam being the upper coal at Eastfield, Stonelaw, and the neighbourhood, and the lowest being the Hurlet coal, which would be found at a depth of about 700 fms. below where the lecturer then stood. About 200 fms. below the Hurlet coal, or at a depth of 900 fms., there was found another seam, called the Houston coal, which was being worked near West Calder. The centre of the Lanarkshire basin was situated in the neighbourhood of Bothwell, where the upper coal was found 150 fms. from the surface; and the splint coal, which occurred at a depth of 80 fms. at Eastfield, was there close upon 200 fms. deep. From that point northward the seams abutted against a large dislocation near to High Blantyre, but eastward they cropped out pretty regularly until the lowest measure, the Hurlet coal—so-called from its being wrought at Hurlet—was met with; and, lastly, the Houston coal was reached about West Calder. The seam corresponding with the Eastfield upper coal was found in Ayrshire about Mauchline and Kilmarnock; in Fifeshire near Wemyss; in Midlothian near Musselburgh; and from those points the various underlying seams cropped out.

SOME SCOTCH COAL SEAMS.

Speaking on this subject, Mr. Moore said that the splint coal was a well-known seam throughout Lanarkshire. At a depth of 14 fms. below it was the position of the well-known Airdrie blackband. It had been bored for at Eastfield, but it did not exist. In like manner, in the neighbourhood of Airdrie there were many seams of value; thus, the Virtuewell coal, elsewhere called the Benhar coal—a fine seam of coal, 3 ft. to 5 ft. thick—was worthless at Eastfield. The Kiltongue coal, which was only 30 in. thick at Eastfield, was 5 ft. to 6 ft. in many places; and in like manner, the famous Boghead coal, which most of the audience might have heard of for its oil-producing qualities, should lie at a depth of 190 fms. below the surface at Eastfield, but it was not found. Descending again, the ironstones worked at Possil, on the north side of Glasgow, and at Lesmahagow ought to be found 400 to 500 fms. beneath the surface at Eastfield. The famous Lesmahagow gas coal, which was the same as that found at Skatterigg, to the north of Glasgow, and at Dalkeith and Niddrie, near Edinburgh, should be found at about the same depth. He said the Royal Commissioners were of opinion that it was practical to work coal to a depth of 600 fms., so that it was not impossible that at some future period Eastfield and Lesmahagow cannel coal would become a marketable commodity.

RISE OF THE LANARKSHIRE IRON TRADE.

After referring to the early seats of mining operations in Scotland, to the relations of employer and employed, boards of arbitration, &c., Mr. Moore said that the county of Lanark had been little heard of as a mineral-producing county until about the beginning of the present century, the coal worked previously being chiefly for local wants. About that time, however, some members of the Carron Company founded the Clyde Ironworks, which gave an impetus to coal mining in Lanarkshire. The east country coalmasters looked with alarm on their ironworks. In the year 1791, shortly after the establishment of the Clyde Ironworks, a writer, in a paper on the estate of Lord Dundonald, of Culross, said—"The following statement is necessary to enable the public to judge of the injury, in one point of light, done to the coalowners by the erection of ironworks. There are two blast-furnaces at Muirkirk, two at Cleland, and three at Carmyle, or Clyde Ironworks, in all seven, of which there are five at present in blast. Each blast furnace, blown by a steam-engine, consumes, including engine coal, workmen's coals, and coals for calcining the mineral or ironstone, at least 9,000 tons of coal annually; thus five blast-furnaces will consume 45,000 tons. As, on an average, each collier in Scotland does not turn out above 8 tons of coal weekly, it will require 112 colliers to work the above quantity of coal, exclusive of other colliers and miners employed to sink pits, drive mines, and work the ironstone. For these purposes it cannot take less than 150 additional hands, so that five blast-furnaces will require 262 colliers and miners, formerly employed in preparing collieries for work, or in working coals for the domestic consumption of the inhabitants of Scotland. This evil is only beginning to be felt, it being certain, from the present price and great demand for cast-iron, as well as from the peculiarities attending many situations in Scotland, that within ten years from present date 20 additional furnaces will be erected, requiring a supply of 2048 colliers and miners. [What, said the lecturer, would they think of Gartsherrie Works, where 10,000 people are employed? Mark the proposed result and remedy.] This supply of hands must either be drawn from the collieries now working coal—in which case coal will increase in price above any calculation now possible to be made—or erectors of ironworks must be compelled to raise hands for their works, by being prohibited by Act of Parliament, by a Bill to be brought in for the special purpose, from employing any colliers now employed at the collieries." The lecturer proceeded to say that the discovery of blackband ironstone eventually led to the establishment of the various ironworks now existing in Coatbridge and elsewhere in the country, and they all increased the consumption of coal in Lanarkshire. Still, it must be said that up to 1820 the magnificent coal field of Lanarkshire remained practically untouched. At that period the whole quantity of coal raised in Lanarkshire was under a million tons per annum, whereas it had now risen to upwards of 14,000,000 tons. The introduction of the railway system occurred about 1824, but it was only since 1840 that it had been much felt, and about 1840 the output of coal from Lanarkshire would not exceed 2,000,000 tons. Mr. Moore concluded by making some general observations, and by referring to the number of persons employed in coal mining, and to the injuries and deaths resulting to the workers in the mines.

MINING IN CORSICA.

Sir,—Following the remarks in a former Journal on the Mineral Resources of Corsica, I shall now proceed to enumerate the existing mines in the island, and briefly state what in my opinion has been the cause of failure or otherwise in their development, and forecast as best I may their future prospects. I am induced to do this by a firm conviction that Corsica is really a most important mineral country, and being likely before long to engage a large proportion of public interest, it may be as well for speculators to know what has hitherto been done, and what is now doing in that country.

1.—Linguizzetta (Native Copper Mine).—Upon the perimetre is situated the Pentone al Kamo, mentioned in the former article, and of which Plinius wrote 1800 years ago. The concession was granted to a French gentleman, and let on lease by his widow to an association of Englishmen, who, about the end of the year 1874, registered themselves as the Corsican Mining Company (Limited). Since their registration no regular work has been done. Previous to that time about 400 tons of stone had been raised, but certainly not in a very workman-like or economical manner. Difficulties appear to have arisen, and the mineral has been sold to defray the liabilities. The better portion (about 80 tons) is now being smelted at a small iron foundry in Bastia, and yields by this treatment 20 per cent. of copper ingots of good quality. The remainder of the stone is estimated to contain 6 to 9 per cent. Defective management in the first instance, and after the formation of the company lack of means, appear to be the reasons for stoppage in this case. With proper administration, and plant for crushing and washing the poorer stone, I can find no reason why this should not prove a remunerative concern. The entire mountain, consisting of a kind of porphyric greenstone interspersed with veins of quartz, appears more or less saturated with native copper, either in grains, nodules, or plates—the latter generally following the quartz veins.

Ersa (Antimony).—Conceded to and held by a Corsican gentleman, who, without proper advice or knowledge, expended a large sum in making a shaft and several galleries, during which time a good quantity of mineral was raised and sold in Marseille. Eventually his progress was stayed by water, and not having the means, or, at any rate, not caring to incur the expenditure necessary for the requisite machinery, he abandoned the working. The shaft, not having been properly timbered, has fallen in and choked up the entire works. Within the past two or three months a new shaft has been commenced upon the lode in a more favourable position, and some good ore raised and exported, but as the work now done is only sufficient to prevent the concession lapsing, the mine may be considered as virtually closed. During the first working a very rich vein of cinnabar was discovered, and a quantity of this has been sold in Marseilles. The difficulty in the way of this property is that the proprietor expects anyone who might wish to take up the mine to refund to him all the money he has so foolishly expended on useless working.

3.—Castifao (Copper pyrites).—Conceded to a firm of Marseille merchants. A good deposit of copper pyrites, which would undoubtedly yield large profits if energetically and profitably worked. The mine is about 50 kilometres from the port, and, consequently, the ore should be dressed close to allow for the transport. This is a fact the present management seems to ignore, as the ore (which could be dressed with great facility) has been sent away without the slightest preparation, and any possible profit thus lost in the cost of transport. One other point may be worthy of notice, and from which readers may draw their own conclusions. An underlie shaft has been sunk for over 15 fms., and from this the mineral and the debris are carried in baskets on the heads of women.

4. Argentilla (Silver-Lead).—Sold by the concessionaire to two Parisians of some fortune, who, after putting up large plant and building for the treatment of copper ore, are now working the mine for argentiferous [illegible] mining companies. The superficial indications of this mine indicated a copper deposit, and, before doing anything to prove the permanent character of the lode, large sums were expended in laying down a large plant for future working. This being completed, and the lode proved, it turned out to be not copper but lead; consequently, new dressing machinery will have to be provided, at the same time large sums are sunk in a plant that, on the most sanguine calculations, will not be required for actual working for some years.

5. Ponte alla Leccia (Copper Pyrites).—Conceded to a Corsican gentleman. The deposits are in large pockets, containing solid pyrites very rich in copper, with leads from one to the other. Two of these pockets have been exhausted. The work was suspended during the late war, I believe, in consequence of the lessees having been drawn for service in the army. There is a report now in circulation to the effect that a Parisian company are making preparations to resume the work.

6.—Meria (Antimony).—Conceded to four Corsicans, who worked it themselves with such success as to recoup all expenditure, and realise a profit of about 100,000 frs.. At this juncture they lost their market for the mineral in France, and not knowing anything about other markets, and fearing the risk and cost of transport to England, they left permanent working, and invested their earnings in vineyards. I believe this concession is now in the market.

7.—Luri (Antimony).—Conceded to natives, who work it in a primitive manner themselves at a moderate profit, with which they are contented.

8.—Farinole (Iron).—Owned by the widow of a Corsican gentleman. She is now negociating the sale to a Belgian firm. The mineral is titanic iron, hitherto worked only for native purposes of manufacture.

9.—Tartagene (Copper).—Granted to the same gentleman as the Linguizzetta, and now owned by his heirs. Left unworked through difficulty of access, although containing a highly promising lode of cupreous pyrites.

10.—Cardo (Iron and Copper Pyrites).—Conceded to a Corsican gentleman, and during the past year let on lease to an English firm, who are working it with good prospects. This mine is one of the best situated in Corsica, being only about 2 miles from the port of Bastia, on a good road. The lode is well defined, and during the last month or two some good yellow ore of 14 to 16 per cent. has been raised, and the mine appears to be in a very promising condition. The mineral first won was very poor, consisting of iron and arsenical pyrites, with a little copper. During the last few days I have seen some stones broken from the surface on this concession containing fair specimens of pitch-blende.

I have reserved for fuller notice the two mines in Corsica now being worked by English companies, as being more immediately interesting to English speculators.

11.—Lama (Silver, Lead, Copper, and Manganese).—Held by the Lama Company of Corsica (Limited). This set is of large extent, covering about 20 square miles of surface, and contains several lead, copper, and manganese lodes. The present company are working in a very careful and economical manner, evidently feeling their way before committing themselves to any extraordinary expenditure. For some months past their attention has been limited to several silver-lead deposits, and some good mineral has been extracted, although not in very large quantities. The unsettled state of the ground has occasioned much trouble and anxiety, and, although in several places the lode is still followed, only small veins of lead have yet been reached. One lode that I have seen is from wall to wall 7 ft. to 8 ft. wide, and carries a decomposed quartz, with barytes, and a fair but variable quantity of lead. This point appears one of great promise, and likely in depth to prove a good mine. The present shaft is down only about 20 metres. Other points which may deserve in future further proof have of late been suspended; and within the last month a good copper lode has been opened. The appearance of this is peculiar, the copper appearing as carbonate and red oxide, with nodules of copper pyrites of the variety known to miners as peacock and bell-metal ore. I am informed that the stones already taken out have, in a general assay,

given an average of 10 per cent. of copper. Little work has yet been done at this spot, as it is some 5 or 6 miles from the other points of operation, but it is the intention of the manager to develope as rapidly as possible this important discovery, which appears to hold out very encouraging prospects to the adventurers. We cannot too highly commend the board and conductors of this mine for the careful manner in which its operations are conducted, no extravagance, no premature or unnecessary expenditure being tolerated in any way. This is certainly a more commendable plan than that before mentioned in the remarks upon the Argentilla Mine.

12.—OLMETA.—Held by the Olmeta Copper Company of Corsica, (Limited).—This mine is about 10 miles from Bastia on either side of the St. Florent-road, and embraces 9 to 10 miles of land. The works consist of several parallel galleries, about 5 metres from each other, opened from the side of the road across a very flat lode, which at the entrances of the galleries is 4 ft. thick. These galleries continue to a distance of 9 or 10 metres on the thick part of the lode, after which it becomes pinched to a width of 2 ft. to 3 ft. The minerals extracted are black oxide of copper, iron and copper pyrites. The pyrites mineral first extracted is not very rich in copper, but latterly some very fine veins of yellow and peacock ores have been found in the more advanced works. A little above these works another lode has been opened on a fine back, and although not more than 18 in. to 24 in. wide, some fine green, yellow, and red ores have been raised. About 200 to 250 tons of average ore, including that first raised, have been shipped to England as a trial; and I am confidently assured that, according to present indications, a very short time only will elapse before a higher class mineral will be reached.

This mine, which is under the same board of directors as the Lama Mine, is conducted in a similarly careful manner. Sufficient has, however, been done here to warrant the company in making some expenditure to enable the ores to be properly dressed to a higher percentage. I observe in a late number of the Journal a letter from a shareholder, who states that he is well acquainted with this property. I must, however, warn readers not to be misled by random statements of lodes 60 ft. wide. On one part of the sett there is a huge outcrop of gossan, over 20 ft. in width; but as far as this outcrop has yet been proved no lode of the kind mentioned by "A Shareholder" has been discovered. I hope, for the sake of those interested, that such may be the case; but exaggerated statements, although they may in a small way benefit shareholders who wish to get rid of a few of their shares, are not calculated to benefit the enterprise generally, or to deceive those who are wise enough to be guided by results in preference to swallowing any nonsense that may be written in the public journals. Surely mining enterprise has already suffered sufficiently from exaggeration and misrepresentation, and it is now time to try a change, and see if sober truth cannot prevail to revive a little the failing spirit of mining speculation.

As far as can be seen, this mine is good enough upon its merits, and no exaggerated statements can add one iota to those merits, but only cause disappointment and distrust.

Of other mineral deposits in Corsica not yet worked I have had an opportunity of seeing many specimens, consisting of antimony, lead, copper, cinnabar, native amalgam, silver, and some nickel and cobalt. Tin and zinc I have not yet met with, although the latter abounds in the neighbouring island of Sardinia.

The northern part of Corsica, from Cape Corse almost down to Bastia, I would call the antimony district; from below St. Florent's, following the ridge of mountains skirting the Nebio to the Lake of Biguglia, abounds with iron; below this the copper district extends to a line drawn from Aleria, on the east coast, to a little south of Corte, and on to Lento. West of Lento to a little below Ile Rousse the indications are of lead and silver. Arsenic, nickel, and cobalt are about the neighbourhood of Orezza, the well-known mineral water of which place contains traces of cobalt.

In thus marking out the districts I do not maintain that the metals mentioned are definitely confined to the districts named. The copper [illegible] and the Olmeta Mine south of Bastia, or of lead out of the district named, and although the iron copper are not so well confined to the districts mentioned, the predominating indications are as above stated. The granitic districts south of Corte do not appear to be so highly mineralised as the primary and secondary formations to the north. But on the Ajaccio side, and also between Corte and Ponte Leccia, outcrops of coal have been discovered. Of this I have seen only small and insignificant specimens.—*Bastia, Feb.* 21. CORRESPONDENT.

SWEDISH IRON ORE.

SIR,—Permit me to say, with reference to "An Engineer's" letter in last week's Journal, that I was in Sweden during the greater part of 1873, and that I ascertained the state of the iron ore market then, which, in short, was that the price of ore was forced up so high by the Swedish demand that it could not pay to export it to this country. Fortunately, I am able to refer to an official document for figures showing the cost of raising the ore and the prices current at the beginning of 1873. The cost of extraction is stated at from 2 9-10ths to 16 francs per ton, and the price of the ore at the mine's mouth at from 24 to over 30 francs per ton. The document I refer to is a report entitled "Ueber den Standpunkt der Eisenfabrikation in Schweden, zu Anfang des Jahres 1873," written by Herr Richard Akerman, of Stockholm, whose reputation as a metallurgist is not confined to Sweden nor to Europe, and printed at the expense of the Swedish Jernkontor (Iron Board or Office). The statements I have referred to are to be found at pages 17 and 18, and read thus:—"Die Unkosten für das ausgeförderte und geschiedene Erz belaufen sich auf 2 9 bis 16 francs per tonne." "Sie werden jetzt bei den Gruben mit 24 bis über 30 francs per tonne bezahlt."

I have already stated my opinion that in order that a profitable trade may be carried on it is necessary that the importer undertake the extraction of the ore in Sweden, and thus make himself independent of the fluctuations of the market there. By doing so he will have the choice of two markets—the Swedish and the English, or rather foreign, market—and if the former is glutted he can fall back upon the latter. Even at present prices there is ample margin for a profit. THE WRITER OF THE ARTICLE.

SWEDISH IRON ORE.

SIR,—Having seen the article on Sweden as an iron ore field in the Journal, and the correspondence arising therefrom, I have thought that a few words upon the subject, and some analyses of Swedish ores, taken from the Jerukontor's annals, might interest some of your readers.

The Dannemora and Persberg districts are, of course, the most renowned; but there are several other districts which produce ores little, if anything, inferior to those raised in Dannemora or Persberg, which are, perpaps, too far from the sea-board to admit of profitable exportation. The Gefle district would, I believe, be the most suitable for shipping purposes, as the mines lie a short distance only from the port, to which there is a railway, and timber-ships which load or call at this port would be glad to carry the ore as ballast.

But to do the thing on a sufficiently large scale blast-furnaces should be erected at the shipping port, and be supplied with coke from England, the colliers taking a back freight of pigs and iron ore. The iron would, of course, be inferior to the Swedish charcoal pig, the fuel being the chief secret of its superior quality; but if smelted with the same care as the Swedes bestow on their charcoal pig it should be equal, if not superior, to anything produced in England for steel-making.

I have alluded to the care taken by the Swedes in smelting, and this is, I believe, one great reason for the superiority of their iron. The ores are constantly tested at the works by fire assay, the officials at every furnace being experienced and highly-educated chemists and metallurgists. The furnace is never charged by the truck-load with ore, flux, and fuel, in pieces of all weights and sizes; but the two first are broken to the size of road metal, and weighed in by the quarter or even less, and the latter added by the basket, which is certainly not more in weight.

The yields of pig-iron may give an idea of the average richness of the furnace charge. Of 19 yields in three districts given in the Jerukontor's annals for 1865–66, the highest is 58·52 per cent., the lower 49·77, and the average 52 per cent.

As to deleterious ingredients of 40 analyses of ore from all districts the average of phosphorus was ·0266 per cent.; of sulphur, ·054 per cent.

The same number of assays from ores of all districts gave 7 per cent. only of manganese protoxide, the highest being 4·06 per cent.

I have no analyses of ores from the Gelfe district, but crucible assays give—

Iron, 63·5 per cent.; phosphorus, 0·015 per cent.; manganese, 2·79 per cent.
" 51·5 " " " 0·022 " " 4·04 "
" 48·5 " " " 0·015 " " 0·01 "

The following are a few analyses of ores from different districts—

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.
Magn oxide of iron ...	70·70	77·40	85·90	88·21	72·79	82·42	79·27	73·35	84·87	—	—	—	—	—
Per. of iron.....	—	—	—	—	—	—	—	—	—	92·17	81·26	84·70	86·75	81·60
Silic.....	6·46	5·75	4·05	6·66	17·10	9·76	17·31	13·74	9·72	4·71	9·70	11·00	8·40	17·50
Alum	·65	·50	·75	1·26	·55	1·31	1·16	1·34	·90	1·41	1·55	1·45	2·70	·90
Lime.....	5·85	4·00	2·70	3·03	1·35	1·96	1·13	5·06	2·00	0·37	2·13	·50	1·45	Trace.
Magn.....	6·35	5·59	2·50	1·29	7·50	4·65	1·15	6·01	1·87	1·58	4·34	1·73	1·29	·50
Manges protoxide	2·00	1·61	1·10	·14	·14	·24	·18	·20	·35	·35	·28	0·14	·65	·19
Carbe acid	7·55	4·00	2·50	—	—	—	—	—	—	—	—	—	—	—
Total	99·55	99·35	99·50	100·63	99·43	100·34	100·20	100·30	99·71	100·52	99·35	99·52	100·62	100·69
Meta iron .....Per cent.	51·20	56·05	62·15	63·87	52·71	59·69	57·39	53·12	61·47	64·52	56·94	59·29	60·72	57·12
Phosphus.....	·0226	·0026	·0033	·0·6	·013	·005	·011	·008	·005	·019	·042	·041	·019	·13
Sulpl	·050	·0·3	·013	·06	·07	·27	·06	·03	·039	·02	·025	·04	·05	·05

1, 2, and 3 are from the Northern, Central, and Southern Dannemora field respectively; Nos. 4, 5, 6, 7, and 8 from different mines in the Persberg district; No. 9 from Hellefor parish; Nos. 10, 11, and 12 from different mines in the Bispberg or Dalkarlsberg district; No. 13 in the Nora or Striberg; and No. 14 in the Grängesberg districts.

W. G. BELL, A.R.S.M.

Duchess-road, Edgbaston, Birmingham, March 1.

MINING IN THE EAST—No. II.

SIR,—Although to-day mining and smelting operations in Servia are neither very extensive nor prosperous, in former times, when the Lower Empire, founded by Constantine, was in its zenith, and in later days, when the commercial Republic of Venice had acquired ascendency in the East, very numerous and extensive works for the extraction and reduction of ores were in energetic existence. From the vast and rich deposits of Rudnik, Kuchaina, and Kapaonik the Latins obtained, probably, for hundreds of years supplies of lead and silver, whilst from Maidanpek the Venetians, and after them the Austrians, drew large quantities of copper. Iron ores were also mined by the Ottomans, who manufactured iron at Samokotscha, near Novi-bazar. Numerous and enormous heaps of furnace slag scattered along the valleys which radiate from the principal mines bear witness to the millions of tons of ore smelted. No records, or even traditions, point to the precise time when these mines were anciently worked, the few coins that have been found being comparatively modern. Some mines show incontestable proofs of the Latin occupation in the remains of Roman baths; very interesting remains of this kind have been recently found at Maidan Cuchania, in excavating some foundations. During the last 400 years this portion of the East has been the theatre of constant struggles for supremacy, and it should occasion no surprise that these works were, in the excitement of the contest, again and again ravaged and destroyed.

In examining the mining districts, it is depressing to see the ruins of so many villages and workshops which formerly enlivened the picturesque valleys in which they were situated. The foundations, and in some places the walls, of the factories are still visible, and the ruins of the Bergkirche distinguishes those which have been reworked by the Christians.

There can be little doubt that many of these works were busily occupied when Amurath, after having obtained at Gallipoli, in 1357, his first *point d'appui* in Europe, marched in 1363 to the conquest of Servia. During the repeated struggles for existence of the Sclavish nation against the Ottomans, from the first campaign conducted by the son of Orchan to the final overthrow of their empire on the capture of Belgrad by Solyman, in 1521, it appears certain that the whole of the works were ruthlessly destroyed, and the mines allowed to fall together. By the peace of Tossarowatz, in 1718, Austria, amongst other provinces, acquired Servia, and immediately commenced the re-establishment of the industries annihilated by incessant warfare. At Maidanpek they particularly devoted attention to the resuscitation or the copper works, and in 1735 they had 24 smelting furnaces at work. The disastrous battles of Widin and Nissa unfortunately lost Austria her supremacy south of the Save and Danube, and all the industries which she had revivified relapsed to their former condition.

The Ottomans, on the re-acquisition or the Sclavish provinces, with the habitual contempt of their haughty nature for all industries, took no measures to encourage a commercial spirit, and consequently all industries connected with the metals were discontinued. The Pacha of Novibagar had commenced reducing iron ores at Samokotscha early in the present century, but the works were totally destroyed during the numerous revolts of the Servians, previous to their wresting from the Porte, in 1815, their independence. They acknowledged, however, the Suzerainship of the Sultan by paying a tribute of about 20,000*l.* per annum.

Exhausted by numerous conflicts with the Turkish troops, who had ravaged the largest portion of the country, the population was occupied many years in reinstating their houses and farms, whilst their rulers were struggling to attain the power of governing. Absorbed in these occupations, and perhaps having imbibed from the Musselmen the belief that all work was derogatory, anything like an attempt to develope the mineral or other resources of the country was difficult. To develope industries requires capital, and men of energy, probity, and capacity. These essentials Servia has not as yet acquired, and though the few intelligent statesmen which she possesses acknowledge the importance of at once developing the mineral wealth of the country, they are powerless against the number of the reactionary party. Under the Regency foreign enterprise was to a small extent encouraged, and an English company established themselves at the old copper mines of Maidanpek. Latterly another English company acquired also Cuchania, and, doubtless, more foreign capital would have been invested in Servian mines but for the unwise resolve of the Parliament that no more concessions should be granted.

It was asserted by the majority in the Skupelinia that it would be more advantageous for the country to work the mines, and in all probability this may be also the most advantageous for the excluded foreigner. The activity anciently displayed in this little province in the operations necessary for the extraction and reduction of the ores of copper, lead, and silver suggests the idea that these mines might be again opened, and wrought successfully. An examination of the old deposits and the accompanying strata gives no encouragement to such an opinion; indeed it is rather a matter of surprise how so much ore as is indicated by the adjacent slag heaps could have been obtained from the mines, as recognised by the heaps of much decomposed attle sparsely scattered over the mountains. There are without doubt many deposits yet undiscovered which might display indications sufficient to warrant the outlay of the capital required to develope them. These have yet to be discovered. The object which I have proposed to myself being to describe the deposits of minerals, and the associated rocks under the influence of which they have been segregated; I do not purpose to give any detailed description of the geology of Servia, particularly as my notes extend over other provinces, throughout which similar strata extend, containing deposits of much the same character. I shall, therefore, simply give a rapid sketch of the geology, but sufficient to make comprehensible the characters of the rocks, and their positions in the chronological succession of strata.

Secondary strata were deposited over the whole of Servia, but in consequence of long-continued plutonic action these strata have been everywhere thoroughly disrupted, and the irregular portions which the upheaval and subsequent denudation have permitted to remain are found lying much dislocated at all angles. No geological examination of these secondary strata has yet been made, but several specimens of *ceratites nodosus* which I got at Golumbatz show the strata there to be muschelkalk, and at Milanwatz and Maidanpek found numerous jurassic fossils. Seams of inferior coal are found much distorted, which renders the winning of them difficult and uncertain. In the lower portions of the valley of Morava and Drina tertiary strata have been tranquilly formed, comprising a portion of the Hungarian basin. The rocks are principally metamorphic, through which appear mountains of granite and syenite. Serpentine is by no means a scarce rock, and is rich in magnetic chrome iron ore. The most conspicuous member of the secondary series is a limestone often dolomitic, about 600 ft. thick, which frequently crowns the crests of the erupted syenite hills. These magnificent escarpements continue sometimes unbroken for 30 miles, and occasion the bold and charmingly picturesque scenery for which metamorphic limestone districts are famed.

This limestone is found at all elevations and in every state of metamorphism, and it is where these rocks come into juxtaposition with the syenite or clay, slate that most of the minerals have been deposited. In districts where the limestone and associated strata have not been so much disturbed lignite is found in regular beds in sandstone. As the description of the ore deposits advance many details affecting local geology will be incidentally given, and will help to a better knowledge of the strata generally.

EMPRESSARIO.

JET MINING IN YORKSHIRE.

[illegible] of jet into ornaments is an occupation for which the quiet old town of Whitby has long been famed, and justly, for considerable artistic ability [illegible] bracelets, earrings, necklaces, and watch chains so cunningly wrought out of the pitchy-looking mineral. Little is known of the method pursued in obtaining jet, or of the districts and strata in which it occurs, and to supply this information in a short manner is now the writer's object.

Dr. Page, in his "Hand-book of Geological Terms," informs us that the word jet is derived from jayet or gagites, terms in their turn derived from Gaga, the name of a river in Asia Minor. Dr. Page considers jet to be more of the nature of amber than of coal, and states that in Prussia it is known as "black amber."

The Yorkshire jet mines are situated in the North Riding, and are to be found principally within a few miles of Stokesley. Some jet is obtained from the sea cliffs in the immediate neighbourhood of Whitby, but this is not mined for, but sought in open workings. The mines are mostly on the spurs of the range of hills lying to the south of the Stockton and Whitby Railway. Jet mining has been prosecuted in the Eston range of hills, and also in the neighbourhood of Rosedale Abbey. The bed in which the jet is found is a stratum of alum shale, about 18 ft. thick, lying a few fathoms above the main seam of ironstone, now so extensively wrought in Cleveland. This shale is bituminous, and a thin piece when lit will burn of itself; on being exposed to the action of the atmosphere it sometimes takes fire, and assumes then a reddish hue, due to the iron it contains; water flowing through heaps of this burnt shale leaves it impregnated with alum, and destroys vegetation.

The search for jet is always commenced at the outcrop of the alum shale; shafts are not sunk either to win or work it. A drift 6 ft. high by 3 or 4 ft. wide is driven in from the outcrop, and if the prospect is cheering a companion drift is put in at a distance of 5 yds. away, and the two are connected so as to secure ventilation. Very little timber is required in these drifts, as the jet-bearing rock is of a tough character. When these drifts have advanced a few yards side excavations are made, and the systematic search for jet commenced. The shale over the roof of the side drifts is hewn or wedged down, and, serving as a platform to work on, the whole thickness of the shale is explored much after the fashion of overhand stoping in a metallic mine. While the preparatory drifts are being driven the shale has to be conveyed outside, and tipped on the slope of the hill, but in the regular course of working as little shale is taken out of the mine as possible. Trams or kibbles running on flanged rails are used for bringing the shale out of the mine to the waste heap. The jet lies irregularly through the whole depth of the shale in flattened masses, varying in thickness from a wafer to 3 or 4 in., and in length up to several feet, the breadth of the mass being a few inches. A piece of jet is termed by the miners a seam. When a seam of jet is discovered it is carefully followed, and excavated in as large pieces as possible. Sometimes weeks will go by and no jet be found, while occasionally there will be exceptional luck, and a great haul of good jet made in a few days. If in driving the exploring drifts no jet is found they are sometimes abandoned without side excavations being made, and operations commenced further along the outcrop. No gunpowder is used in working the shale; its action would injure any jet lying near, and the nature of the shale is opposed to the successful use of explosives.

The shale in which the jet is found becomes much more difficult to work as the outcrop is left behind, and for this reason the drifts seldom advance as far as 100 yards. When exploring near the face of the shale the roof frequently gives way, and a fall to the surface takes place; in this way ventilation is often secured.

The number of men employed in jet mining is difficult to arrive at. Most of the mines are worked by a partnership of two, four or six men, who have usually other work to which they turn their attention in dull times and in the summer weather. It would also be a difficult matter to state the quantity of jet produced annually. Probably not more than 100 men are employed in jet mining in Yorkshire.

An explosion of inflammable air is reported to have taken place

in a jet mine some years ago. It would probably be due to oily vapour exuding from the shale. In the ironstone mines of the district explosions occur now and then, probably from the same cause. In 1873 a jet miner was killed by a fall of shale.

It is a mistake to suppose that the district under discussion supplies all the jet used in Whitby. Foreign jet is largely used there. The foreign jet is not so durable as that raised in the district, and is much more apt to fly to pieces on sudden exposure to the sun or other source of heat.

If the shale excavated from the mines could be put to some use, and it must be remembered that it contains both oil and alum, this, in conjunction with the working of jet, might make it a subject worthy of the consideration of capitalists. J. B. A.

Feb. 28.

COAL-CUTTING MACHINERY.

SIR,—The Supplement to last week's Journal contains a report of a paper read by Mr. F. Hurd before the South Staffordshire and East Worcestershire Institute of Mining Engineers; while I do not wish to detract an iota from the credit due to him for his persistence and ingenuity in the matter of coal-cutting machinery, I think it highly unsatisfactory that a man of position should make and reiterate statements so utterly at variance with reason and fact as that "air can be stored at a high pressure and be again used as motive power, giving off a power equivalent to that used in so storing it;" and then as a climax, "that 1 lb. of steam by one of his machines is made to give 3 lbs. of air!" and, though this may in one sense be correct, he appears careful to so state it as to give the idea that his machine multiplies the power by 3, which is too unreasonable, especially taken in connection with the article on "Underground Haulage in Mines," that appeared in the *Mining Journal* a short time since, which showed that even with the most modern machinery the loss of power is at least 50 per cent.

As this subject is one of particular interest, I should be glad if Mr. Hurd would produce figures—say, diameter of steam and air cylinders, stroke of each, effective steam pressure, pressure of air produced, and if not working the same number of strokes per minute the number of strokes made by each piston per minute. If his statement be correct he need not fear figures. My apology for presuming to trespass so far on your space is my desire that not only myself but others may arrive at the truth. TYRO.

Widnes, March 1.

ROSWAG'S PROCESS FOR TREATING METALLIC SUBSTANCES.

SIR,—Absence from home prevented me from seeing the letter signed "Black Jack" in the Supplement to the Journal of Feb. 19. When I wrote the account of Roswag's process, published in the Journal of Feb. 5, I did not contemplate entering on any controversy as to the validity of his patents or the novelty of his invention, suffice it to say that I believe them to be unassailable. The process of Mr. Spence, so far as I can remember, consisted in a treatment of the ore (blendous galena) in its *raw* state with *cold concentrated* muriatic acid, presuming that the lead would thus become chloridised while the blende would remain unattacked, and without commenting on the feasibility of the process I may add that even in first principles it has but little in common with Roswag's. I do not think Mr. Spence ever contemplated the reduction of the lead chloride by zinc, or the recovery of the zinc as oxide, by precipitation from its solution, in fact, he did not intend, apparently, to dissolve it at all.

I should be glad to know *where* Dr. Percy has described Roswag's process "at length," as "Black Jack" states, unless, indeed, he may have done so in the name of Roswag himself, in his last edition.

I see that in my statement of cost of treatment I *did* forget to mention the price of the ore, a most important element in the calculation. Although, however, unmentioned the cost of the raw material was included at the rate of 35 fr. per ton, being 50 fr. for the ore in question and 28 fr. the price at which we purchase the lead sulphate in and about Paris. F. MAXWELL LYTE.

Cite de Retiro, Paris, March 1.

THE SEPARATION OF MINERALS.

SIR,—It is much to be regretted that the discussion of practical questions relative to mining is not more frequently proceeded with on their merits. One would suppose that men pretending to be practically experienced in any particular department and desirous of ventilating their knowledge, whether for the benefit of others or their own personal distinction, would find something more laudable to indulge in than despicable personalities.

The concentration and division of mineral ores is a branch of practical mining attended with much difficulty, and cannot be successfully executed even approximately without great attention and close observation. A mass of mixed minerals cannot be reduced to their constituent or molecular condition by mere crushing and stamping, and if by those processes it could be accomplished, what possibility is there that each particle of each particular ingredient would be found of the same size and density? The nominal, or even the absolute, difference in the specific gravity of particular minerals cannot be determined by treating the whole in mass mechanically in consequence of a gradation of size between the two extremes—that is, from the finest to the largest of the particles. If we take the specific gravity of iron pyrites as 5, and copper pyrites and blende as 4 (all of which is a little under their reputed specific weights), the difference of 1, amounting to 20 per cent. in the specific gravity of these minerals may be fully counterbalanced by a difference of crystalline texture pertaining to the respective minerals.

In crushing a mixed quantity of these ores who will undertake to say that in the process adopted all will be reduced to a similar size? Will it not rather be found that a larger proportion of the copper pyrites and blende has been reduced to a pulp than of the iron pyrites, which from their greater molecular adhesion will most probably retain to the last a decidedly gritty condition? But whilst this is the case a gradation of size will still be found in each case, according to the meshes of the sizing medium through which they have been passed. It has been found in practice that a greater difference of specific gravity than that which obtains between blende and iron pyrites—iron pyrites and galena—is completely counteracted under certain circumstances by the difference of size in their several particles inevitably occurring during the process of crushing, and so long as that exists it will impose an obstacle of a formidable kind to their entire separation by mechanical means.

If anyone contends that he is able to accomplish that which no one heretofore has been able to accomplish it ought not to be very difficult for him to explain the process, and furnish some evidence of how it can be done. It will be useless to assert that it can be done by individual skill or ingenuity without some special device, and then it must be shown at the same time that such device is capable of inverting an immutable law of Nature, as the heavier a body the more resistance it will oppose to an attacking force, and where two or more such bodies are similarly situate an equal resistance will be offered.

This principle applies to a heterogenous mass of pulverised minerals, of a uniformly variable size, from sand, more or less fine, to fine flour, and it is found in practice that the difference in their specific gravity is completely overcome by an unavoidable difference of size, and this is fully confirmed by the application of water during the process of endeavouring to effect their separation in the act of dressing. I have seen most of the delicate appliances had recourse to in the dressing resorted to in the dressing of lead—buddling, framing, dilluing, tossing, chimming, &c., but never have seen mundic cleanly separated from the lead in the fine state. A division was made out; that which was designated lead contained a deteriorating percentage of mundic, whilst the mundic extracted retained a wasteful percentage of lead. Now, if lead, which has a specific gravity 50 per cent. greater than that of mundic, cannot be separated from it effectually, how is blende to be with a difference of specific gravity 30 per cent. less? If the difference of specific gravity in metallic minerals is counteracted by accidental occurrences, which are at the same time inevitable at certain stages of their treatment, it is difficult to conceive by what means it may be overcome, seeing that the principle upon which the operation depended has been irredeemably vitiated by an inevitable consequential event, and thus rendered inoperative. ROBT. KNAPP.

THE PRESENT PROSPECT OF BRITISH MINING ENCOURAGING.

SIR,—It is always well to take a hopeful view of ones surroundings in depressing times, especially if facts are within reach from which reason may depend to confirm and sustain the outlook. Of late dulness has not wholly been confined to mining, but has extended to trade and commerce of almost every department. The drop in tin has been most depressing on the generality of Cornish mines, and the chilling effect which it has produced extends widely beyond that province. But is there any good reason why British mining generally should be depressed because tin is low in value, and Cornish mines from their depth and expense of working cannot in many instances be made to pay? I think not. It is always painful, however, to give up an old friend, whether it be a mine or an individual, and admit in opposition to long-cherished feelings to the contrary that decadence has overtaken it or him.

To those who survey the aspect from an impartial point of view the conviction is not easily resisted that its prestige has departed. It may flatter itself, or permit itself to be flattered, that its glory is but temporarily obscured, and that its star will again gain the hemisphere luminous in all its pristine splendour and brilliancy. But where is the evidence of this to oppose the competitive danger by which it is threatened? I confess, though with conscious reluctance, that I see it not. Its interested friends essay to soothe themselves and strengthen others by saying that Australia cannot continue to produce and send tin to this market at 50*l.* per ton, but how little do they who say this know of the capitalists of Australia, or of the indomitable energy and resource of the Anglo-Saxon when committed to any enterprise in a new and free land. The United States of America, Canada, Australia itself, and New Zealand bear ample testimony upon this point. If the Cornish peninsula were the only field for British mining, as it is the chief source of its tin, it would be as deplorable to think of its decline from an investor's as it is now from a national point of view, but such is not the case; if times change, so also do the events of time, and if at the present we have to lament the decline of our tin produce, from whatever cause, we are cheered with the prospect of a vast increase of lead in many parts of the country, and the attention which is now being given to lead mining. Investors are concerned with the most prolific sources of revenue, and are not usually affected sentimentally by local circumstances or prejudices, and it is well that they should hold themselves free from those influences, although I am well aware it is not always easy to do so, as from long-standing connections circumstances intervene, so that a separation can only be effected with some difficulty, but the incentive is a powerful one, a necessity dictated by prudence in defence of self interests, to neglect which involves pecuniary loss and sullies a business reputation. In all the pursuits of life men are unavoidably affected by circumstances, to comprehend which and cultivate an easy adaptability to them is the course most proper to pursue and the most beneficial to all interests, whether personal or general, and hence if the popular sources of industrial wealth fail, in whatever direction, to remunerate investments, if even no others of a better class presented themselves, it would be necessary on principles of political economy, as well as from personal interest, to withdraw from them. But in the present case others do present themselves, and with an attractiveness of force which need only to be seen to be acknowledged and appreciated.

It is foreign to my purpose to divert attention from Cornish mines. On the contrary, I am desirous they should receive all that is due to them, and, further, am fully convinced that they will. But whilst this is the case more certain and less expensive sources of investment ought not to be neglected in deference to them, and should the depression of mining in that far-famed county be allowed to retard its progress, especially in those parts which are unaffected by the circumstances which depress it. If tin is low lead is high, and if tin mining is depressed as a consequence lead mining by the same rule ought to receive an increase of attention. I am glad to see that, to some extent, this is now the case, and that lead mines are coming to the front supported by credentials which can neither be gainsaid or mistaken. I am quite certain it would be extremely difficult to convince Cornishmen, who have never seen much mining outside their own county, that such prospects existed in different parts of Great Britain as there do.

Judging by the patronage and support which has been extended to that county, they would be more likely to conclude that if it were a reality it would not be regarded with so much indifference, and so much wealth so easily accessible be allowed to remain dormant and undeveloped to the present time. It would be a sufficient answer to such an objection to point to what is now being done in many parts of the country. In Yorkshire, for instance, and Wales, how many mines of excellent promise are there now being opened up, and with how little capital and time compared with the old, deep, depleted, and expensive mines of Cornwall.

Investors will naturally turn to the most prolific sources of revenue so soon as they become known, especially when it is seen that less outlay, and conseqently less risk, is incurred by them, as well as a much larger return from the amount invested; and it should never be forgotten by mine agents especially that it is the solid success of investors which gives life and activity to mining, and in truly prosperous times all interested are more or less benefited. It would add to the value of mining greatly if a few scores of the bogus schemes pretentiously called mines were instantly consigned to oblivion. But they are kept afloat by ingenious artifice, solely, it would seem, as a sport of legalised medium for the passage of money from one pocket to another, and without the shadow of a chance of their ever becoming productive. A MINER.

WEST TOLGUS.

SIR,—At present Cornish mining is resting under a cloud, which lowers grimly and threateningly upon its interests. Much has been written, and many widely different and bold opinions have been expressed—some of them not worth much, others fraught with interest and of the deepest meaning. Copper mining does not appear to share in the general depression to any great extent, and among our copper mines West Tolgus still holds a foremost place. With the utmost regularity dividends are paid six times a year, and a very respectable balance is in hand to meet contingencies. Whilst the shareholders are being well remunerated, the managers are judiciously improving the plant, erecting new dressing machinery, and putting up engines with a view to ensuring permanent profits, and making the best of the future. As mine managers we doubt if those of West Tolgus are to be surpassed; and wherever mining is known the Messrs. Taylor are recognised and respected. They employ men as officials that can be implicitly trusted, and thus everything like low truckling is absent from their staff. Besides this, they have a system of accounts—a healthy state of finance is always preserved where they have control. At West Tolgus one never finds heavy amounts debited as "interest and commission," but, on the contrary, there is invariably a good balance with the bankers. There one never sees a grumbling merchant, all are sure of their pay on the proper day. At the last meeting, for instance, the ore credited was sold up to December, whilst the labour cost was charged up to the pay previous to the meeting—up to the latest possible date. Thus, though the books and accounts at the meeting only showed a balance in favour of the mine of 1170*l.*, yet compared with other mines in the county the credit balance would really be 5000*l.*

Leaving finance, one comes to the most important part—the underground working. The exploratory operations are very numerous, two shafts were being sunk by 24 men, this alone causing a very heavy expenditure. Nine ends, too, were being driven, thus pointing to a very exceptional system of working. After all, the great thing is permanency, and here one is quite satisfied in West Tolgus. Taylor's shaft is distant about 200 fms. from Richards's; in the former a splendid course of ore has been driven through in the 125, and is now being driven towards the 138; in the latter, the western ground, a new and shallow mine is being opened up. In the 125 a lode was passed through worth, in some parts, 150*l.* per fathom, and 120*l.* per fathom for a very long distance. It is very probable that this lode has improved in depth, but granting that it maintains its former value, all this will be standing for 13 fms. high—the greatest prize of mineral in Cornwall: indeed, the whole county may be challenged to produce such a mine as West Tolgus—so sound in finance, efficient in management, rich in mineral, and promising such wealth in prospect. Although it has only paid 25s. every two months, now, in less than six months we may expect to see this more than doubled.

Feb. 29. CORNUBIA.

GOLD IN WALES—No. XX.

DOLGELLEY DISTRICT—DOLFRWYNOG SECTION *(continued)*.

DOLFRWYNOG MINE *(continued)*.

ASSAYS.—1863: Dr. Percy (per Mr. Richard Smith), July 16, 1863:—From Fownog Level:—"The coarsely powdered sample of ore containing galena from North Wales, weighing about 9½ lbs., has been assayed for gold. The result is as follows:—Native gold, separated in sifting, 3 oz. 16 dwts. 11 grs. per ton of ore; ditto obtained by assaying the sifted portion, 34 oz. 1 dwt. 16 grs. per ton of ore: total, 37 oz. 18 dwts. 3 grs. per ton of ore. The 37 oz. 18 dwts. 3 grs. of native ore contains of gold 28 oz. 14 dwts. 19 grs.; ditto, of silver, 9 oz. 3 dwts. 8 grs. The large proportion of silver present probably exists in the galena."

Johnson, Mathey, and Co., Aug. 12, 1863:—Produce of pure gold from 108 lbs.—123 grs.; at the rate of more than 5½ ozs. to the ton.

1863.—Experiments with Britten's machine:—580 lbs. quartz from Fownog level gave 16 grs. of gold=2 dwts. 16 grs. per ton; 252 lbs. quartz from No. 2 and 3 levels gave 2½ grs.=20 grs. per ton; 33 lbs. quartz (picked) from Fownog level gave 60½ grs.=8 oz. 11 dwts. 3 grs. per ton; 112 lbs. quartz from old workings at the bottom of No. 3 level gave 19¼ grs.=16 dwts. 11 grs. per ton.

DIRECTORS' REPORT, Feb. 9, 1864.—Underground: No. 1 Shaft: The new lift of 6-inch pumps has been fixed in the place of the old 3 inch pumps left by the old company at the bottom of the mine, thus virtually increasing the pumping power one-half. No. 3 shaft has been made the drawing-shaft, and the guides fixed and completed as far as No. 4 level, and work well. The continuation of this shaft towards No. 5 level is being holed with all dispatch, and the communication will be completed in four to six weeks, when the mine will be in thorough working order. —No. 4 Level: The communication from No. 3 to No. 2 shaft is made, and the level is in working order. A lodge has been made in this level in No. 3 shaft, and about 20 tons of quartz has been raised to surface from the lode, which is here fully 5 ft. wide, of a very congenial quality for gold, and it is intended to push forward the stopes towards the Fownog level. No. 5 level has been cleared and retimbered where necessary, and the communication from No. 1 to No. 3 shaft is perfectly safe and complete.—Quarry Lode: This lode, which was so very promising, has been disturbed by a cross course, but it is considered advisable not to abandon the workings for the present.

The following is from Sir R. Murchison's "Siluria" (1864):—"Prof. Ansted, who has examined the gold veins in Merioneth, has reported to me that at Dolfrwynog the gold is disseminated both in bands and in irregular bands or veins, parallel to the Lower Silurian schists, lying near to the junction of a greenstone with slaty rocks. The gold is partially present to such an extent that in a small quantity removed by himself from one of these veins it yielded, upon an analysis, 60 ozs. to the ton."

MEMORANDUM.—The following assays were made from the ores of this mine (see Calvert's "Gold Rocks of Great Britain"):—1. Galena and carbonate of manganese, 60 ozs. 3 dwts. gold.—2. A trace of gold.—3. Gold, 4 ozs. 14 dwts.—4. Gold, 50 ozs. and 60 ozs.—5. Silver, 18 dwts. 8 grs.; gold, 4 ozs. 18 dwts.—6. Slaty stuff, 1 oz. 5 dwts. 8 grs. silver and 5 ozs. 13 dwts. 12 grs. gold.—7. Quartz with copper, 16 dwts. 3 grs. silver and 13 grs. gold.—8. Quartz with iron pyrites, 3 ozs. 3 dwts. 12 grs. silver and 6 ozs. 2 dwts. 12 grs. gold.—9. Slaty pyrites, 2 ozs. 12 dwts. 6 grs. silver and 130 ozs. gold.—10. Grey stuff, 246 ozs. 8 dwts. gold.—11. Mixed ores, 149 ozs. 6 dwts. 11 grs. gold.—12. Quartz (no visible gold in it), 3 ozs. 2 dwts. gold. —13. Quartz, 300 ozs. gold.

The "United Dolfrwynogs" (or "Jolly Frogs") included East Dolfrwynog, West Dolfrwynog, and North Dolfrwynog, all situate in Llanfachreth parish, and will be found in the Ordnance Sheet, 75 S.E.

The following extract is from a paper read by me at the British Association meeting at Cambridge in 1862:—

"East Dolfrwynog Mine is on the east of the last mentioned (Dolfrwynog), and takes in the farms mentioned in the Ordnance Map—Buarthrae, Doledd, and Penbryn. There are six or more lodes on this property, which give on assay of from 6 to 9 dwts. of gold per ton. The Dolfrwynog gold lode runs into Penbryn, a few yards from the spot where the richest gold was discovered. It is about 5 ft. wide, and of precisely the same character, and will probably prove as rich."

Afterwards (1862) Mr. MOSHEIMER wrote:—"The Dolfrwynog gold lode crops out on the hill at Penbryn, and that part of it just opened shows as promising quartz for gold as any in the district."

BUARTHRAE.—Capt. G. WILLIAMS wrote (June 28, 1862):—"You are lucky of Buarthrae, for by dialling the gold lode of Dolfrwynog comes to the boundary in the Doledd side."

DOLEDD.—Capt. G. WILLIAMS wrote (Jan. 27, 1863):—"I tried some of the alluvial to day from the gold shaft, and found specks of gold."

PENBRYN.—Capt. G. WILLIAMS wrote (Dec. 31, 1862):—"The lode has greatly improved since you saw it. I have sent a parcel to Mr. Pochin. It is a kindly-looking lode, and I think it would be a wise plan to go on for another month on this before sinking on Doledd. The lode is about 3 ft. wide, containing flookan, &c., on both walls, with quartz, mundic, native, yellow, and grey copper ore, and I believe gold."——Again (March 27, 1863):—"A most beautiful lode. I am daily expecting to see gold."

The mineral products of these setts are auriferous and argentiferous galena, copper pyrites, iron pyrites, blende, and auriferous quartz.

North Dolfrwynog Mine is bounded on the the north by the Cwmheisian Gold and Silver-Lead Mine, north-east by Moel Hafod Owen, east by Buarthrae, south-east by (old) Dolfrwynog Mine, south-west by West Dolfrwynog Mine, and west by the River Mawddach. The mineral products are copper pyrites, iron pyrites, blende, and tetrahedrite (occasionally), auriferous quartz, and virgin gold. There are 10 at least defined metalliferous lodes in the sett, amongst them five of the Tyddynglwadis lodes. The (old) Dolfrwynog gold lode, on account of its underlie (6 ft. in a fathom), is in its richest part under the North Dolfrwynog boundary.

Mr. J. C. GOODMAN (March 24, 1852) wrote: "There has been but little work done upon this sett, although the prospects have good indications, and had every advantage for the operations being continued. The old adventurers have opened on the back of three distinct lodes traversing through this sett. The lode south, facing Dolfrwynog, is a fine copper lode opened on the summit of a hill about 200 ft. above the plat of Dolfrwynog. A shaft has been sunk from surface on the lode, and a shallow level driven to intersect this, being a depth of about 5 fms.: from this they get some good stones of copper, which are now to be seen upon the bank, the lode is about 2½ ft. to 3 ft. in width, bearing south-east by north-west, and with very little cost this lode can be proved to a much greater depth by driving an adit on the south side, and sinking a winze to meet the same. To the north they have opened upon another lode bearing south east by north-west, and driven along it about 25 fms.; there are some very fine gossan and quartz to be seen upon the bank showing every appearance of carrying gold, and I would particularly recommend a very careful assay being made of both gossan and quartz. To the north-west of this lode they have opened upon the third lode, and which by its bearing would lead me to say is the same as the great silver-lead lode of Tyddynglwadis; there has very little been done here, the lode is a very strong quartz lode, more or less intermixed with lead and copper, and fully warrants more trial. The sett taken altogether possesses every advantage for working, as levels can be driven at a depth of 400 ft. to 500 ft. from the western side, and I have no hesitation in strongly recommending any party to work it, feeling satisfied that at a proper depth great returns will be made from this mine."

Prof. ANSTED, F.R.S., wrote (April 20, 1853): "This sett is granted on the opposite side of the valley from the Dolfrwynog copper mine on a continuation of the lode to the north. The country is the same on both sides, the lode has been costeaned and cut by shallow pits at various points, and appears to turn towards the west so as to identify itself with the lode at Tyddingwladws, not following the direction indicated in the coloured map of the Geological Survey, and not placed in the same position with regard to the greenstone. As seen on the ground the lode is from 2 to 3 ft. thick, in white killas, and consists of quartz spotted with copper pyrites, all in a highly crystalline state. There appear to be other lodes adjacent. In respect to the gold found at Dolfrwynog, it must be noticed that the auriferous threads occur chiefly, if not entirely, in bands parallel to the stratification of the schists. They must be sought for by cross cutting if not met with in sinking, and the right direction to cross cut would be to the east. The lode at North Dolfrwynog is very promising for a course of good copper ore at a moderate depth."

Capt. G. WILLIAMS (May 2, 1853) wrote: "In our costeaning we have succeeded in opening on the back of the north and south lode about 7 ft. wide, underlying east, which bears out good indications for copper.—George's Lode: We have cleared the level and shaft, the lode being well defined, from 3 to 3½ ft. in width, bearing north-west and south-east, composed of quartz, flookan, sulphur, and good stones of copper ore."

Capt. G. WILLIAMS (July 12, 1853) wrote: "Since our commencement we have discovered two other lodes, one bearing east and west the other north and south, which makes the number of five lodes traversing through this valuable sett. The north and south lode being about 7 ft. in width, composed of flookan, quartz, sulphur, and black oxide of copper; we have opened on the back of this lode in different parts on this sett, where it proves to make regular in its bearing, with well-defined walls. About 7 fms. south-east of an opening made on the north and south lode we made another exploring, where we came upon an east and west lode, composed of gossan, quartz, mundic, and showing a little copper. I am not able to give the exact width of this lode without further trial be made, but by the indications that this lode bears I believe that I never had the pleasure of examining a more promising lode. It makes a junction with the north and south lode in about 9 fms. from the present opening, and to make a further trial on this a level should be driven from the west side to come in at the junction of these two lodes, as a mine could never be better situated for the advantage of levels, and also an abundant supply of water to work any machinery.—George's Lode: We have completed the timbering of the shaft and No. 1 level. The men have also completed the plat, and have this week commenced the sinking of the winze to intersect No. 2. No further trial has been made upon the lode since you were here, but merely timbered what was necessary, as I considered by what you saw of the lode the ore on surface and the samples sent you proved to your satisfaction on this part that nothing was wanted but greater depth.—Adit, or No. 2: We are progressing with our driving, the ground tears well this week, six miners and one labourer have driven in all about 3 fms., and after reaching George's lode we shall have a back of 17 fms. to No. 1."

MEMORANDUM.—Assays by Mr. John Mitchell, F.C.S. (Jan. 28, 1854)—I have examined a sample, marked "North Dolfrwynog," button of gold, sent by Mr. Readwin, and find it contains 66½ grs. of fine gold and 4 3-10ths grs. of fine silver. —Note: This gold was extracted from 16 ozs. of quartz in which no gold was to

be seen under a powerful microscope when reduced to a fine powder.—T. A. R.—Feb. 6, 1854: I have examined a sample, marked "solid amalgam," in a bottle, from North Dolfrwynog, sent by Mr. Readwin, and find it contains mercury, gold, silver, lead, bismuth, iron, arsenic, zinc, and copper in traces.

Capt. G. WILLIAMS wrote to Mr. H. D. Pochin (March 1, 1862):—"Yesterday I drew off, after sending 4 cwts. of alluvial through the machine in 4 lbs. mercury; this I strained through the leather, the result was no amalgam. Mercury clear and healthy. I tried the stuff now and then in the tub, and got the prills (of gold) sent. I only had one blanket barren, and I had three prills in another. Would you not think it a wise plan to go down between the alluvial and the rock, to see whether the gold is not to be found in greater quantity there?"

Capt. G. WILLIAMS wrote to Mr. H. D. Pochin (March 3, 1862):—"George's lode has now become more compact and making stronger, being about 2 ft. in width, composed of quartz, mica, &c., with specks of copper and lead, and about 2 in. of black oxide of iron, &c., on hanging wall, underlying a little north. Niel's lode is about 3 ft. in width; the copper has taken into the hanging wall, parting from the lode. The lode is composed of flookan, schist, quartz, carbonate of lime, copper, lead, blende, mundic, &c. The lode is disturbed, and it is not unlikely that the south west branch, which came in 4 fms. from entrance of driving, is making off to the north."

Captain G. WILLIAMS (March 6, 1862) wrote to Mr. H. D. Pochin as follows:—"According to your instructions, I beg to hand you my views and explanations of of the proposed new shaft to be sunk on or near the boundary of Dolfrwynog Gold Mine. After carefully dialing and inspecting underground in day level in Dolfrwynog Gold Mine, I beg to furnish you with a rough plan of the boundary. The proposed shaft, lodes, and underlie of the gold lode, together with two shafts, Nos. 2 and 3, sunk on Dolfrwynog. I can vouch for its correctness, except the underlie of the lodes. The underlie, if any, is too little, as the underlie in 17 yards perpendicular in Gold shaft gained towards North Dolfrwynog boundary 48 ft., and to be guided by this (should the underlie continue so) we shall be on the lode in 40 fathoms in the proposed shaft, but I know it does not underlie so much in other parts, so I have taken a fair average, but I am confident in my own mind that the lode will be reached in North Dolfrwynog sett before 50 fathoms. By placing the shaft as marked on the plan I consider this better than being so close to the boundary, although the lode could be reached sooner by commencing nearer to the western boundary, but by doing so we could not work the eastern part of the lode without interfering with the other sett, but by sinking our shaft in the spot marked on the plan we shall be able to work east and west, and also we shall come sooner on the run of gold. I am not quite sure for future workings, so as to have our drivings from the shaft to lode, whether the shaft would not be better further off than the marked one from boundary. I should propose the shaft to be 8 ft. by 5 ft., inside the timber, so that there may be ample room for a lift and winding stuff. Two good surface drains will be required in the first start, and also two or three reservoirs. This shaft is proposed to intersect the lode in the North Dolfrwynog sett at a depth of 50 fathoms by a small cross-cut in the bottom."

Mr. MOSHEIMER (Oct. 25, 1862) wrote: "Alluvial or Surface Diggings: These diggings are on the North Dolfrwynog sett, on the banks of the Mawddach. The alluvium has been worked by crude machinery, by which means coarse gold has been obtained; but it has not been ascertained where the gold originates, whether it has been washed down and deposited by the water of the river, or has been carried down from the hills above, where several quartz lodes are cropping out of the same property. It would be very satisfactory if it could be proved that these gold deposits originated from the decomposition of the quartz. There are two levels opened. The top level shows a well-defined lode, containing gold by my assays from 6 to 10 dwts. per ton. The lower level does not a show a well-defined lode. The old Dolfrwynog gold lode runs close to a portion of this property—about 18 yards off, and 40 fms. deep."

The following extract is made from the abstract of my paper last referred to (1862):—"North Dolfrwynog Gold and Copper Mine is situate on the east bank of the Mawddach. There are 10 metalliferous veins in this property, and all of them auriferous. The Dolfrwynog rich gold lode underlies into this sett, and it is certain that at a depth of 60 fms. very rich gold ore will be found. Assays of the lode stuff from this mine give an average of 9 dwts. of gold to the ton. The author said that he had once extracted as much as 6 ozs to the ton from stuff in which gold was not detectable under a powerful microscope. He had recently superintended the removal of about 100 tons of alluvium from the eastern bank of the Mawddach with the object of discovering whether the particles of gold found therein increased in size from the surface to the bed rock. He found this to be the case, and the sample of coarse-grain gold produced was, perhaps, the most interesting item of the recent discoveries. This gold (several ounces) was obtained by a very rough washing over a trough 30 ft. long—a process which washed away all the fine gold, weighing probably 10 times as much as the course gold obtained. It is probable that the whole side of this mountain will be found to contain gold in paying quantities on the erection of machinery to economise labour."

MEMORANDUM.—I erected at my own cost one of Sloper's gold-washing machines. The patentee himself did not make it answer the purpose. A considerable quantity of the alluvial gold from this mine may be seen at the British Museum.

Capt. G. WILLIAMS (April 7, 1862) wrote:—"I only got a very small amalgam by squeezing through leather, and I was very uneasy, thinking that something might be wrong, after buying fresh quicksilver and using the utmost precaution; so I distilled the mercury, and in doing this I got another mishap—the retort got too hot. All the mercury was drawn off, and the gold coated all round the retort. However, I was satisfied that the fault was not in the working of the machines. I have sent the little I had to Mr. Pochin. I also distilled the stuff you saw squeezed through leather, and sent the amalgam of that the same time from the stuff on the boundary lode."

Capt. G. WILLIAMS wrote to Mr. Pochin (Aug. 25, 1862):—"George's Lode: In our driving we have intersected a cross course. The lode continues much the same in size and matrix, but what she will make in the junction we shall see in a few days. Harvey's lode is a fine lode, 3 to 4 ft. wide, composed of schist, quartz, and mundic, with spots of lead and blende, looking well for gold. The result of assay and amalgam you will have received from Mr. Mitchell from both lodes. Pugh is still at work at the alluvial."

Capt. SPARGO wrote (Nov. 2, 1864): "During the past month we have been exploring this part of the mine (North Dolfrwynog) and I am glad to report you success in opening two splendid lodes.—No. 1: This lode is opened on a distance of 45 fms. in length; I find its longitudinal bearing is 17° south of east. It is variable in size from 3 to 6 ft. in width, altogether of a promising character, being composed of quartz, oxide of iron, mica, and spots of yellow copper ore. Its underlie being 3 ft. in 6 ft., which is considered by all practical men a favourable underlie for the production of minerals, there cannot be a doubt of this lode yielding large quantities of mineral if wrought on to a reasonable depth (that is, judging from present appearance). I may also remark it is from this lode I discovered gold by vanning on the shovel.—No. 2: About 10 fms. south of No. 1 we discovered No. 2, and have laid it open about 8 fms. in length. According to its longitudinal bearing, 20° east of north, it forms a junction with No. 1. This lode is full 5 ft. wide, of a similar character to No. 1, and also the appearance of the rich gold lodes laid open in this district. It obleaques the lodes laid open at the Gwynfynydd Gold Mine. We have broken from this lode several rocks of quartz, upwards of 15 cwts. in a rock, and also laid it open at the junction of No. 1 to a depth of 7 ft., at which point stones of solid copper ore can be broken similar to the specimens forwarded to the office, and I am justified in stating better stones of copper cannot be broken in Devon Consols or any other mine I have hitherto seen either in England or Wales. I cannot state the size of the lodes at this point, being not sufficiently opened on. There cannot be a doubt but visible gold will also be found as we open on the lodes. I, therefore, advise the sinking of a trial shaft on the course of lode at the junction (say, to a depth of 10 fms.), and, judging from present appearance, abundance of mineral will be found. The water is strongly issuing from the lode, which I consider a favourable indication. I am of an opinion these lodes will be found of great value, it being seldom known to fail where such subterraneous champions form a junction of their yielding large deposits of mineral, especially when in a mineralised rock."

DIRECTORS' REPORT TO THE SHAREHOLDERS (Dec. 20, 18[illegible]).—During the past year your directors have pursued the same line of policy which marked their operations in the previous year—rather to watch the proceedings of neighbouring mines, and defer the erection of any expensive machinery until further discoveries would warrant the outlay. In exercising this discretionary power they consider they have consulted the best interests of the shareholders. Their operations have been principally at the Bog shaft, near the Turf Copper Mine, the Penbryn Mine, North Dolfrwynog "boundary lode," and the alluvial by the side of the River Mawddach. The agent's report will show the extent driven at the Bog shaft, Penbryn, and North Dolfrwynog; many of these lodes are well defined, and contain occasional specks of very good copper ore. Several holes have been dug through the alluvial to the bed rock, and small particles of gold found by washing the so I in a batea. Sloper's goldwashing machine did not answer the purpose intended. Having had great reason to be dissatisfied with the conduct of the late agent, he was dismissed, and your directors concluded that the best course to be pursued would be to engage a Cornish captain, and let him have Cornish miners under him, in order, if possible, to obtain greater regularity of operations. Captain Spargo, the present agent, being highly recommended, was engaged, and sent into Cornwall to select some good miners. Since his appointment to the agency he has erected some simple and suitable hauling machinery at the Bog shaft; he has also opened upon two promising lodes for copper at the top of the hill, on the North Dolfrwynog Mine. One of these lodes he has laid bare at the surface for 40 or 50 fms. Its average width is about 3½ ft. It is a quartzose lode, carrying copper pyrites, which is well distributed through the quartz, and the agent expresses himself strongly confident of being in a short time able to produce paying results from this lode. The underlie is about 3 ft. in a fathom. The other lode is about 10 fms. south of the preceding, and is laid bare for about 8 fms. This lode forms a junction with the last described. It is about 5 ft. wide. It is not improbable that this may be one of the points whence the copper came which formed the Turf Copper Mine. In consequence of this new discovery attention is diverted from the Bog shaft, in order to sink a shaft, and to prove whether the copper continues in depth. Since the last meeting several attempts have been made to amalgamate this company with the London Dolfrwynog Company,* but without success. It was evidently the interest of all parties that the properties should be worked under one management. Many of the London Company's shareholders thought so, but, overvaluing their machinery, the negociations were broken off. The mine has since been stopped, and is to be sold. The proverbial tardiness which characterises all engineering proceedings in Wales, has prevented much being said as to the comparative merits of the machinery proposed to be used at the neighbouring mine for the extraction of gold. The plan about to be adopted (and nearly ready) on a very large scale at the Welsh Gold Company's Works and at the Clogau Mines is to work all the visible gold through Britten's machines, to stamp with the ordinary Cornish stamps all the rest of the mineral, and pass the whole bulk over inclined planes covered with blankets, thence through a series of Hungarian amalgamators; then to put the concentrated metallic substances found on the blankets carefully through Mosheimer's amalgamators, which have been found at the Clogau Mine to answer very well.—(Signed) HENRY DAVIS POCHIN, Chairman.

Capt. G. SPARGO wrote (April 18, 1865): "I tapped the Brittens yesterday, and found a very good amalgam from 5 cwts. of stuff."——July 11: "I have retorted the mercury, and sent the gold to Mr. Fleming, the secretary; 10 cwts. of stuff from east and west lode."——Nov. 25: "I got out 10 dwts. from 1½ cwt., and 8 dwts. from 3½ cwts. of lode stuff."——Dec 16: "I have completed the ton from No. 3, and got 1 dwt. 2 grs. of gold, which I have sent to Mr. Fleming."

West Dolfrwynog Mine is bounded on the north by the North Dolfrwynog Mine, on the east by (old) Dolfrwynog Mine and the River Wen, and on the west by the River Mawddach.

The following extract is from the paper referred to above:—"Adjoins the last-mentioned (North Dolfrwynog) on the South, and is marked on the Ordnance Map 'the Turf Copper Mine,' from the singular fact that some time ago about 10,000*l.* worth of copper was sold from the ashes of peat, there burnt for the purpose. The water at the present time is highly saturated with copper, and a shaft now in course of sinking will probably discover a large deposit of copper, if not gold. The gold stuff gives on assay about the same quantity of gold as North Dolfrwynog. On a portion of the mine the author found the alluvium to contain gold under the same circumstances about the same proportions as the North Dolfrwynog Mine. Gold has been obtained here at the rate of 6 oz. to the ton. The minerals of this mine and Dolfrwynog are identical in character."

Capt. GEO. WILLIAMS wrote (1861)—"Through this sett the Dolfrwynog great gold lode traverses. In the western side a level has been driven 150 fathoms on a north and south lode, from 3 to 4 ft. wide, containing flookan, quartz, lead, copper, mundic, blende, and mica. A few tons of this lode have been tried for gold in Perks's machine, and all gave more or less gold, sometimes producing good amalgams, but we were beaten entirely by the sickening and loss of mercury. In a lode on the east of the sett I have seen visible gold (*sic*) in quartz. I also carefully washed and dressed the different ores named and sent a sample of 4 lbs. to Mr. Lamb, which he assayed, and produced over 300 ozs. of gold to the ton of dressed ore. I send with this three or four prills of gold washed from this alluvial. Whosoever will be the lucky party to discover the copper in this sett will reap a fortune, there being two or three lodes not proved, or even touched, and these running right under the peat, making a junction with the north and south lode in the Bog, being east and west lodes)."

Capt. G. WILLIAMS (March 27, 1863) wrote:—"A lode will be cut I expect this week in Bog shaft."

MEMORANDUM (1862).—The water at the present time holds so much copper that a piece of polished iron immersed in it will become covered with a film of copper in a short time. The metalliferous products are auriferous blende, tetrahedrite, and galena, copper and iron pyrites, auriferous quartz, and virgin gold.

Captain GEORGE SPARGO wrote (Nov. 2, 1864).—"The lode in the level at Bog shaft is somewhat disordered, as also the lode in the stope in back of the adit level."

The "Jolly Frogs" Company eventually went into liquidation without debts or liabilities, and remained in a state of liquidation for nearly a decade of years, a monument at once of how easily a joint-stock company can be formed, and the difficulty attending its winding-up, to which I shall again have to refer. The principal proprietors of these mines were Messrs. H. D. Pochin, A. Peek, Readwin, Owtram, Blain, Keighley, Oxley, and C. K. Sings.

March 1. T. A. READWIN.

SUB-WEALDEN EXPLORATIONS.

The following letter has been addressed to the Editor of the *Times*:—

SIR,—Some time after the meeting of the British Association at Brighton a committee was formed and a boring begun near Battle, in the lowest strata of the Wealden area, for the purpose of discovering what kind of palæozoic or primary rocks there lie beneath the secondary formations. These may be coal measures, Silurian rocks, or any other formation belonging to the palæozoic series, and the undertaking is universally considered by geologists to be of great scientific and practical importance.

The work was finally committed to the Diamond Rock Boring Company, and by that company it has been executed, as far as it has gone, with complete success and in the most liberal spirit. The expenses, which are necessarily great, have been met by private subscription, aided by grants from the British Association, the Royal Society, and the Treasury, it having been felt that the undertaking is a matter of national importance.

The boring has now reached a depth of 1900 ft., and is still in the oolitic strata. It is very doubtful whether the fund left at the disposal of the committee will more than suffice to carry on the work to the depth of 2000 ft. When first it was begun palæozoic rocks were expected to be reached at a less depth, and should further pecuniary aid not be forthcoming there can be little doubt that this great experiment must shortly be abandoned.

It is highly improbable that such an opportunity of examining the geological structure of this part of Britain will ever again occur: and it is calculated that with an additional outlay of about 2000*l.*, a depth of 2500 ft. might be attained, which, whether the palæozoic rocks were reached or no, might solve a question of great scientific, if not indeed economic, value.

Some of the members of the committee, and especially Mr. Willett, of Brighton, who have hitherto largely contributed towards the expense of the undertaking, have expressed their willingness still further to increase their subscriptions. Other gentlemen, in the most disinterested manner, have done the same, neither the committee nor their friends having any aim in the matter connected with personal profit. The amount promised falls, however, short of what is required, and it is hoped that the scientific value of the result to be attained may induce further assistance from those who may consider that money would not be thrown away in helping to solve this most important practical problem.

Subscriptions will be thankfully received by Mr. H. Willett, F.G.S., Arnold House, Brighton; or by any members of the committee, including— A. C. RAMSAY, Chairman of Committee, and Director-General of the Geological Survey.
JOHN EVANS, late President of the Geological Society.

THE WEST JEWELL MINE.

SIR,—I shall feel obliged if any of your readers can give me information as to the existence or non-existence of the West Jewell Mine. Some years ago I was induced to take some shares in the mine, being led to understand that it would pay from 40 to 50 per cent. in a very short time. Glowing accounts continued to be circulated from the offices of the company at intervals of about nine months, with an appeal to the shareholders for more money, as a little extra capital was considered all that was required to develope its great riches. I took extra shares, but since the beginning of last year I have heard nothing whatever of the mine.

Pall Mall, March 1. A SHAREHOLDER.

PENNERLEY MINE.

SIR,—I notice that this mine has attracted some attention of late, transactions in the property being more numerous, and at reduced prices. The 120 east is worth, by last report, 1 ton per fathom. The 120 west has increased to 1½ ton per fathom. In Potter's Pit portion by the end of March the 90 fm level will be driven towards the north lode—a very important point, as it will open out great wealth. Pennerley shares will, no doubt, be eagerly sought for in a month's time at a high figure. Not long since these securities were freely bought at prices varying from 4*l.* 10*s* to 4*l.* 15*s.*, without any depth of importance having been attained in the Potter's Pit end, which portion of the mine touching Tankerville is now looked upon with so much interest. That Pennerley will pay large dividends in a short time few can doubt, and in the eyes of all practical men the adventure ranks second to none. SHROPSHIRE MINER.

RICHMOND CONSOLIDATED MINING COMPANY.

SIR,—A rumour having been circulated to the effect that there was only sufficient ore in the mine to keep the furnaces running for three months, the directors sent a cablegram requesting a statement of reserves, and received the following in reply:—

"Report utterly false. Await Price's second report.—PROBERT."
"Reserves last reported on not materially diminished; ore body between sixth and seventh levels untouched. General prospects excellent.—RICKARD."

Coleman-street, March 3. THOS. WESTBURY HALL, Secretary.

[For remainder of Original Correspondence, see to-day's Journal.]

THE RICHEST MINE IN THE WORLD, AND THE PHILADELPHIA EXHIBITION.—"Prodigious" is the word employed to the exhibit which it is proposed to represent the Consolidated Virginia and California Mines at the forthcoming Centennial Exhibition. It is proposed to put on a sufficient force of workmen during May to extract an amount of ore which when converted into bullion will be of the value of $10,000,000. Arrangements have been made to employ the Sharon and other mills for its reduction, and in June it will be forwarded to Philadelphia. It will require 15 cars bearing 10 tons each to transport the silver bars; there will be 3300 silver bars altogether—150 tons of solid silver bricks. These will be exposed at the National Exhibition as an evidence of what the Pacific Coast can do. Such a spectacle as this will, we are quite certain, be a complete and satisfactory answer to the question of the value and permanence of our mines. It will go further than volumes of writing or reams of scientific reports to give assurance of the inexhaustible mineral wealth of our Coast. This ten millions of gold and silver, bearing upon it the Mint's stamp of fineness and value, will be the product of 30 days' labour from a crevice in the earth only 1200 ft. in length. It will give such assurance of the vast possibilities of our mining future as to astonish the world. The equal of this bonanza deposit has never been found. From the Consolidated Mine alone there has already been extracted $24,000,00. If the California shall, as we understand it will, be put at once to sending forth its ores, the next four months will add $12,000,000, and if Messrs. Flood and O'Brien keep their promise for May $10,000,000 will be added. Then if the two mines, dropping down to their every day habits, shall yield $3,000,000 per month, we will have for the balance of the year $21,000,000, so that by Dec. 31 of this year this 1200 ft. of the Comstock lode will have added $67,000,000 to the wealth of the world—and all this within a period of three years. In speaking of this display to be made at Philadelphia, we style the bullion "silver bricks;" it will be understood, however, that the bars contain 48 per cent. of gold to 52 per cent. of silver. The figures we have made above are all within sober probabilities. People from abroad will reflect that $24,000,000 have within the past few months been taken from the Consolidated Virginia Mine alone, and that the California, although fully opened and prospected is still a virgin mine. These mines are now upon the market, their shares selling at a price that gives little less than $100,000,000 as the value of the two mines.

* The Old Dolfrwynog Company.

Meetings of Public Companies.

THE LLAY HALL COAL, IRON, AND FIRE-BRICK COMPANY.

The third annual ordinary general meeting of shareholders was held at the London offices, Queen Victoria-street, on Wednesday,

Mr. BENNOCH, the Chairman, presiding.

The CHAIRMAN, in moving the adoption of the report, congratulated the shareholders on the improved position which the company's property has attained during the past year. Upwards of 100 yards of sinking had been effected in the pits during that period, and seven seams of coal passed through. The Drowsill seam had been proved 7 ft. 6 in. thick instead of 3 ft. as expected, and the Two-yard coal had been reached about three weeks since; the Crank coal was hourly expected to be met with, and operations would be continued to the Main coal, about 45 yards below the present depth in No. 2 pit, which was expected to be reached in May. It was also stated that a pair of 30-in. cylinder winding-engines, capable of raising 600 tons a-day, were in course of manufacture for the company, and would be delivered during March, so that it was believed the colliery would be capable of a considerable output of coal during the present year. He (the Chairman) stated the contemplated additional machinery for the clay works was in course of delivery, and the company would shortly be able to treble their present production, and manufacture sanitary pipes of all sizes, flooring, and roofing tiles, a superior quality or fire-brick, in addition to the articles they were already making. The company's railway and rolling stock were reported to be in excellent condition, and the line quite capable of carrying the large traffic that it was expected would be sent over it. The intention of the directors to commence at once the erection of 30 cottages for their workmen on the company's freehold adjoining the works was announced.

The Right Hon. the Earl of AIRLIE, K.T., seconded the adoption of the report and accounts, which was unanimously agreed to. His lordship stated that he had every confidence in the ultimate success of the undertaking; and that although more time had been occupied and a greater expenditure incurred in the development of the property than was originally anticipated, he thought the company's property would compare very favourably with others of a similar nature in every respect. The work, his lordship added, both in the sinking and equipment of the pits and other parts of the works, had been done thoroughly and unmistakeably, as the board considered the first cost in a property of this magnitude and importance, although large, to be the most economical in the end.

On the motion of Col. MCDONNELL, J.P., the retiring directors (Messrs. Duke and Graham) were re-elected, as was also the auditor, Mr. Latreille.

Major-General MORTON, R.E., moved, and Capt. ADDISON seconded, a cordial vote of thanks to the Chairman and directors for their spirited and persevering policy in the interests of the shareholders, which the Chairman briefly acknowledged.

A vote of thanks was, on the motion of the Earl of AIRLIE, seconded by Mr. WALCOTT, C.M.G., awarded to Mr. E. S. Clark, the company's manager, for his untiring exertions in the company's interests, and a similar compliment to Mr. H. R. Duke, the secretary, closed the procedings.

It was mentioned incidentally that the 86 bonds of 50*l.* each, forming the balance of the unallotted debentures, would now be issued. These are a portion of the 12,500*l.* first mortgage debentures created last year, and bear interest at the rate of 7 per cent. per annum, payable half-yearly, by coupon attached, at the company's bankers.

IMPERIAL BRAZILIAN COLLIERIES.

An extraordinary general meeting of shareholders was held at the company's offices, Cannon-street, on Wednesday,

Mr. JOHN O. SURTEES in the chair.

The SECRETARY read the notice convening the meeting.

The CHAIRMAN said that he would really have very little to say to them, as the meeting was of an almost formal character. They had frequently had to call the shareholders together, and the result of all their discussion was that he thought they had at last discovered a means of saving the property. It was proposed that the trustees of the debenture-holders—Lord Bingham and Mr. E. Bryan Williams—should in conjunction with the directors create a new first charge for 2000*l.*, overriding all existing charges, such 200*l.* to be applied firstly in paying pressing engagements and then in carrying on the company's business in Brazil. They had arranged with Baron d'Ornano to go out to Brazil to represent the company's interests before the Brazilian Government and obtain for them either a money grant or a contract for their coal, the conditions being that the Baron shall pay his own expenses and receive commission upon results obtained. By the resolution at present before the meeting the directors would hold the property for the debenture-holders, and it would perhaps be well for him to explain that although the debenture-holders are undoubtedly creditors in the country they are not secured creditors in Brazil, because to render their security good in Brazil the contract should have been registered in that country, so that the present debenture-holders are not secured, but as there are no other creditors no one else is injured by giving them possession. By a little expense, however, they could register out there, and obtain their full rights in Brazil. It was thought that if the debenture-holders were put in possession they would take up this prior charge; care would of course be taken not to render up possession until 500*l.* was provided for pressing engagements in Brazil, and from 250*l.* to 300*l.* for the emergencies of the company. Baron D'Ornano had been successful in his dealings with the Brazilian Government, and the terms which they had made with him were favourable to the company. He concluded by formally moving—

"That in view of the danger to be apprehended to the company's concessions in the event of winding-up, the directors be requested to co-operate with the debenture-holders with the object of saving the property, if possible, for the shareholders, and with power to borrow money on any terms they may deem expedient. That the directors are hereby authorised to enter into possession of the company's undertaking for and on behalf of the debenture-holders, and, if need be, to effect a sale of the undertaking, the debenture-holders providing the necessary funds from the date of possession being taken, upon special terms, if thought proper by the directors. And for the purpose of carrying out this resolution, the following powers are hereby conferred on the directors."

Mr. MAUDE thought they would hardly attempt to work the mine with [illegible], and the shareholders ought not to think that with that amount they could [illegible] for a new seam of coal. They should let the Brazilian Government thoroughly understand that unless they got a money grant, or its equivalent, in the shape of a contract for their coal the concern would collapse. The company had already sunk over 100,000*l.* in the property, and lost it all, and if the Brazilian Government does not show a disposition to assist in the matter English people would certainly not subscribe to any other Brazilian enterprise.

Mr. WALKER WEBB (the solicitor of the company) remarked that Mr. Pochin had thrown out a suggestion to the debenture-holders at their meeting, held recently, as to the difficulty of registering the deed in Brazil, also on the rights of the Provincial Government as shareholders, but had since taken the opportunity to tell him that he had discovered that there would be no difficulty in the matter, and that the debenture holders would have the same rights as other shareholders. The debenture holders ought to realise the fact that 500*l.* sent out now would be better than a much larger amount at a future time.

Mr. GOODSALL did not see that there was any prospect that more than about [illegible] would be raised, and feared that amount would be perfectly useless. He would also enquire whether it was not Mr. Westlake's opinion that they ought not to pay more than 5 per cent. on the new charge, considering it was offered over the head of 10 per cent. He understood the interest was to be 5 per cent., and the bonus 100 per cent.

Mr. MAUDE thought that the terms now offered—10 per cent. interest and 15 per cent. bonus—were better.

Mr. WEBB reminded them that by carrying out the arrangement the debenture-holders would have the property in hand, so that there should be no fear of [illegible] subscribing, for they must pay off local debts before the property could be offered for sale. The directors were of opinion that if 500*l.* were now sent out, and either 250*l.* or 300*l.* was forthcoming shortly, it would be possible to make arrangements which would prove beneficial to all parties.

The CHAIRMAN agreed with Mr. Goodsall that 625*l.* alone would be complete useless. If they did not get a money grant or contract from the Brazilian Government the concern must collapse.

Mr. WEBB said they had thoroughly impressed upon Baron D'Ornano the fact that if this company collapsed it would prevent further English capital being employed in the industrial enterprises of Brazil.

A SHAREHOLDER enquired what was the minimum amount of capital required to reach the lower seam of coal?——The CHAIRMAN would think 500*l.* at least, be

at present they were only discussing the raising of money to meet their pressing engagements.

Mr. MAUDE regretted that the Emperor was away at the moment, as he believed the Emperor was the only one who really saw what was for the interest of his country.

A SHAREHOLDER suggested that nothing could be done in Brazil without bribing the officials. He had found by experience that it was well to employ a Brazilian to deal with the Government, and give him a percentage on the results. By employing an ex-judge he had secured a good amount which he would never have got otherwise.

Another SHAREHOLDER enquired whether Mr. Webb considered there was any reasonable prospect of obtaining the 1000*l.* which appeared to be required.

Mr. WEBB thought there was a good chance of getting 800*l.*, and with this they could go on.

Col. RADCLIFFE seconded the resolution as an independent shareholder, and in the conviction that the step contemplated thereby was their last resource, and afforded the only hope of saving the property.

The resolution was then put from the chair, and carried unanimously.

The second resolution was also put from the chair, and carried unanimously, as follows:—"That the documents now submitted by the solicitor for carrying out the foregoing resolution be, and they are hereby, approved, and the directors are requested to execute the same accordingly.

Col. RADCLIFFE moved, and Mr. DUDGEON seconded, the following resolution:—"That the best thanks of the shareholders be given to the directors for the time and attention they have devoted to the concerns of the company in the interests of the proprietors." This was carried unanimously.

The CHAIRMAN, in acknowledging this vote of thanks, said he thought he might congratulate the shareholders on having at length arrived at an understanding which they would be able to carry out without the necessity for holding any further meetings.

Col. RADCLIFFE moved, and Mr. LAITY seconded—"That the thanks of the shareholders are due, and are hereby given, to Messrs. Maude and Goodsall for their services as members of the committee appointed at a former meeting to confer with the board, and for the very large amount of trouble they had taken in the discharge of their duties."

This resolution was also carried unanimously, as well as a vote of thanks to the Chairman, and the proceedings terminated.

SOUTH AURORA CONSOLIDATED MINING COMPANY.

A general meeting of shareholders was held at the Cannon-street Hotel, on Wednesday,—Mr. H. W. SPRATT in the chair.

Mr. C. CADOGAN (secretary) read the notice convening the meeting.

The report of the directors stated that the policy laid down by the directors is and has been to avoid as far as possible the sinking of the capital, but to lend the same out on mortgage at interest from time to time, and so to use the money over and over again, also to see as far as possible that the money advanced is properly applied—to acquire fully paid up shares in different borrowing companies by way of bonus, and their policy, as far as they can judge, promises to work out well in the interest of the shareholders. After having expended on the South Aurora Mine a very large portion of the capital of the company, it was arranged that no further exploration should be made until the working of the adjoining mines in depth warranted such expenditure, and, consequently, the South Aurora Mine expenses were reduced, and since the last meeting have been still further lessened, and are now as low as it is possible to keep them consistent with safety. The only point still capable of further reduction is that of the insurance (Dr. Goodfellow's in-structions being at present to continue the insurance), and the directors will be glad of an expression of opinion on the part of the shareholders as to whether the entire or reduced risk shall be taken by the company or not. A project for driving a tunnel under the Eberhardt and Aurora and other mines, as well as the company's mine will, it is believed, be shortly proposed, the object being to demonstrate what mineral veins or deposits lie in the deep, and so to extract the same at a minimum of cost. The directors will, when the scheme is well matured, bring the matter before you. The directors have consented to accept, without prejudice, 3600*l.* in satisfaction to their claim to certain water pipes in connection with their mill in Nevada, and expect that sum will shortly be received. The company's operations have resulted in the employment of a considerable sum on first mortgages at interest representing 8 to 10 per cent. per annum, and in acquiring shares (fully paid-up) in the various borrowing companies as and by way of bonus. Until such time as the interests and dividends in the different enterprises will amount to a sufficient sum to declare a cash dividend on the shares of this company, the directors propose to divide from time to time a portion of the bonus shares amongst the shareholders, for which purpose the shares of the Olmeta Mining Company are, in their opinion, the best adapted at the present time, as the mine is now opening out well, and a considerable quantity of ore has been already shipped to this country. In order to carry out this proposal, it is necessary to alter the Article of Association, and a resolution will be submitted to an extraordinary general meeting, to be held immediately after the ordinary general general meeting is over. The directors will propose to give the holders of shares in this company one share, of the nominal value of 1*l.*, in the Olmeta Company for every three shares held by them in the south Aurora Company. This will absorb 20,000 shares for this year's division. The shareholders will thus have the opportunity of either selling these bonus shares, or, if they are so disposed, keeping them until the mines are more fully developed. There are a few shareholders who hold one or two shares in the South Aurora Company, and the directors propose to give to these shareholders a certificate stating that the holder is entitled to one-third of a share, or two thirds, as the case may be, and this plan will be adopted for any surplus shares held beyond a multiple of three.

The CHAIRMAN said the directors had continued to adopt the policy inaugurated some time since, and set forth in the pamphlet issued last June. It was very difficult to produce a satisfactory dividend upon so large a capital, and the present board advised that the unexpended balance should be husbanded in every possible way, therefore, they had endeavoured not to make investments, but to lend money from time to time, charging good interest, for the development of properties, and securing shares as bonus in the different companies. The shareholders were already aware to which mines money had been advanced on first mortgage at 10 per cent. As far as the South Aurora Mines were concerned, a scheme would probably be proposed, emanating from their neighbours—viz, the Eberhardt and Aurora Company—to drive a tunnel under the several mines. Capt. Drake, who had so well managed the Eberhardt Mines, would shortly be in this country, and no doubt would give all the necessary information. With regard to the Olmeta Mines, upon which they had advanced 3648*l.* on first mortgage, bearing 8 per cent. interest, it had been seen by the reports that the works were progressing satisfactorily, and that some 300 tons of mineral had been raised, leaving 400 tons in reserve. The captain informs them that they had lately opened on several small branches composed of quartz and iron pyrites, all dipping on the flat lode. What result this will have on the lode must be awaited for. They have also discovered in cosseaning a lode west of the flat lode running about 30° east of north through the concession. The lode is about 2 ft. wide as seen at surface, and composed of very pretty quartz, with good stones of mineral, containing green carbonate, red oxide, and yellow copper ore. They propose at once to sink a small shaft on the lode, as the prospects in sight are very cheering. There are other lodes in the concession which can be explored at some future period. The agents consider the future prospects favourable to the enterprise. There had been shipped 130 tons, and they had been advised of another shipment of 116 tons; they had hoped to have given to-day the result of the assay of the ore, but were unable to do so, in consequence of the strike that had taken place at Newcastle; but at the next meeting the necessary information would be communicated. A great deal depended upon the result of the assay, because it might be that they would have to treat the ore on the spot, for which reduction works would have to be erected. As to the proposition to distribute the shares as a bonus, although practically a dividend, the board would rather take the opinion of the shareholders than decide upon their own responsibility. The directors wanted the shareholders' opinion, but thought it expedient the power should be given to-day to distribute those shares, because at any time they could be distributed should they suddenly become of value. With regard to the Lama Mine, upon which, up to January last, the company had advanced 2600*l.*, as a first mortgage, bearing interest at 8 per cent., and holding 40,000 bonus shares, it at present had not fulfilled the promises held out by Capts. Glanville and Trelease in their reports, but the directors are watching the developments with great anxiety, so as not to expend more money than is absolutely necessary before deciding as to the best course to be taken. The mining area was so vast that it was difficult to say what quantity of mineral may be on the property, and Capts. Cock and Hancock were fully alive to the wishes of the directors, and retain their entire confidence. The agents remark that—

"It must be borne in mind we have a very extensive sett, an area of about 20 acres, and the present works extend over about one-tenth of the area, and some large mineral lodes are to be seen cropping out at surface, and on some of them we purpose making some trial so soon as the weather permits outdoor working."

A letter received this morning states that a new lode had been cut, with ore yielding 10½ per cent. of copper, and should it hold it would prove extremely satisfactory. With regard to the Anguilla Company that promised to be a very fair speculation. Under date Jan. 17 the captain in charge wrote as follows:—

"I estimate the cost of extraction at about 2*l.* per ton f.o.b., but some quarries yield at much less cost per ton—Cartouch Bay last month at about 30*s.* per ton, the quality being by it appearance close upon 80 per cent. if not fully, and this month I expect it to give me a good quantity for the hands employed, at possibly 1*l.* per ton. Again, I have No. 3 Flat Capt, which last month did not cost me more than 1*l.* per ton. I am very pleased to be able to say that, as a whole, our prospects are encouraging, and yet we have not discovered any deposit of consequence, although I am in hopes that I am on the track of a submarine (new) deposit at Simpson's Bay.—Shipping: I have instructed Mr. McNish to charter a vessel for 250 tons to load here, to load first at Simpson's Bay and finish here. I beg to thank the board for their promptitude in meeting my wants in stores, &c., and trust that the time is not far distant when I may have the pleasure of congratulating them on a permanent success."

With regard to the Gilbert and Chaudiere Company, to which they had advanced 4000*l.*, and had received 10,000*l.* in bonus shares, he read a letter addressed to that company by a mining engineer who had inspected that property, which stated that there was no field in Australia with such favourable prospects for alluvial gold, and that when properly opened up the capital would be returned many times over. With regard to the balance-sheet, he wished to direct attention to the item for general expenses, which in 1874 amounted to 799*l.*, and in 1875 to 537*l.*, showing the directors had exercised due economy. Telegrams in 1874 had cost 75*l.*, but in 1875, 96*l.*; the law costs in 1875 were 170*l.*, but in 1874 there was no item under that head, because the bill had not been sent in at that date, so that, practically, the item was for two years. In 1873 the result of the profit and loss was 1371*l.*, when a dividend was declared of 2*s.* per share; in 1874 profit and loss amounted to 3579*l.*, and in 1875 to 1181*l.* Hence, since the company had been formed the profit and loss amounted to a total of 6665*l.*, and of that 6000*l.* had been paid to the shareholders in dividends. The present assets of the company, including the amount of 3600*l.* for the water pipes at White Pine, amounted to 30,714*l.* He hoped before long the item of 3600*l.* would be in their coffers. They were extremely desirous to reduce their expenditure in America to the lowest possible figure, and had instructed Dr. Goodfellow to use his discretion in renewing the insurance upon the mill for 8000*l.*, which costs 400*l.* per annum. Mr. Applegarth thought they might take that risk upon themselves, but it was a question upon which the directors would like to have their hands strengthened by the shareholders. He then moved that the reports and accounts be received and adopted.

Mr. TOWNE seconded the proposition.

Mr. BARROW wished to know if the shares proposed to be distributed had any market value? They might be called a dividend, but if they had no market value it would be better not to distribute them. It was to be regretted the result of the assay of the ore had not been received from Newcastle, because if not satisfactory they would have to determine whether the ore should be reduced in that country. He should like to know what amount would be necessary to erect reduction works?

Mr. WILLIAMS asked if the cargo promised from Anguilla had been shipped?

Mr. LANDAU said that as they had advanced money upon the copper property, and had a mortgage upon it, they should retain the largest voting power. As long as the shares were held by the directors they could vote as they liked. He would certainly ask the directors to retain those shares as trustees until the mortgage had been paid off, and the shares acquired a proper value. He did not think they should pay 400*l.* per annum insurance for the mill. He thought it should be sold for whatever it would fetch. ("No, no.") He should like to know by whom the other half of the ordinary shares were held, and he thought the money on deposit ought to realise sufficient to meet the expenses at home. As to the assets, the Chairman's figures read very well, but absolutely they did not exceed 12,000*l.* in cash; that should be used differently, and invested in 5 20ths, or United States Funded. They had quite enough magnificent, and the balance of the capital should be so invested as to repay the present expenses, and then they could patiently wait for success from the various properties.

Mr. T. G. TAYLOR objected to the distribution of the shares, because they were not at liberty to distribute unless they had earned it, and the Olmeta had not repaid the advance, and they did not know it would repay, to say nothing of profit. The Chairman had said too little about the proposed tunnel through Treasure Hill; should that tunnel be carried out, ores from the different mines would be trammed down the hill, and their mill would become of great value. It was very desirable that tunnel should be driven for both the Eberhardt and South Aurora Companies. For this reason he would rather make "assurance doubly sure" and insure the mill, at any rate for the next 12 months. He did not attach much importance to Mr. Lockwood's report upon the Canadian gold properties, especially as he saw Mr. Banner Oakley had had something to do with them.

Mr. APPLEGARTH, in reply to a question, said the mill originally cost 60,000*l.*

Mr CHAMBERS thought the time was not far distant when the mill would be a source of considerable profit to the shareholders. He should like to hear Mr. Applegarth express his opinion on the subject.

Mr. CARPENTER asked if there was any liability upon those shares?

Mr. BENNETT reminded the Chairman that he stated at the last meeting that the money advanced to the Mammoth Copperopolis Company would be recovered.

Mr. HOME asked if the company had made any further advances?

The CHAIRMAN, in reply, said there was no absolute value to the shares, because there none upon the market, but as the ore was now being returned those who held the shares might soon receive good dividends. He knew if he had the shares he should not think of selling them. Reduction works could be erected for 1500*l.* to 2000*l.*, should it be deemed expedient to erect them. The cargo from Anguilla had not been shipped, as they had become unable to get a ship; instructions had been telegraphed over that as soon as a ship could be obtained at proper freights a cargo was to be shipped. The remaining half of the ordinary shares were held by the vendors of the mines, and the terms were given in the original pamphlet. The question of insuring the mill he (the Chairman) should leave to be decided by the meeting. The board never contemplated selling the mill, especially as in these days, when science was making such rapid progress in dealing with poor ores, the time might come sooner than was expected when the mill would be wanted. Their only anxiety was that it cost 1000*l.* a year, including watchmen, insurance, &c. As to dealing with the shares, the direction would certainly take the opinion of the shareholders and be guided accordingly. He thought, however, power should be given to the directors to distribute the shares, but not to be used except with the consent of the shareholders. In no company did the directors give more time and attention than in this; they certainly worked as if they were dealing with their own money. Shareholders might rest perfectly satisfied their interest was well looked after. As to the Gilbert Gold Company, the interest was to be paid out of the first profits. He believed they would be repaid the advance made to the Mammoth Copperopolis Company. He believed that company had a magnificent property, but unfortunately they had no money. Other advances were being made during the present year; those would appear in the next accounts.

The report and accounts were received and adopted.

The retiring directors and auditor were re-elected.

The CHAIRMAN proposed that the directors be empowered to insure the Stamford Mill for the sum of 8000*l.* for 12 months.

Mr. CARPENTER seconded the proposition, which was carried unanimously.

An extraordinary general meeting was then held, when the resolution to alter the Articles of Association was passed.

A discussion ensued upon the policy of distributing the shares, resulting in a decision that the sanction to do so should be first obtained from the shareholders.

A vote of thanks to the Chairman and directors closed the proceedings.

WHEAL UNY TIN MINING COMPANY.

A general meeting of shareholders was held at the offices, Austinfriars, on Tuesday,—Mr. WALTER PIKE in the chair.

Mr. HICKEY (the secretary) read the notice convening the meeting, and the minutes of the last were confirmed.

The accounts made up to Jan. 3 (three months) showed a debit balance of 1465*l.* 5*s.* 3*d.*

The report was read, as follows:—

Feb. 28.—The rise in the back of the 150 is communicated with the bottom of Hind's engine-shaft. We have now to enlarge the rise referred to and make the shaft complete to the bottom of the mine, which will probably take two or three months. As soon as this is completed we shall be able to turn the old pumping engine idle, and to save considerably in the working expenses of the mine. The lode in the 40, west of incline shaft, is worth 8*l.* per fathom. In the 100 end, east of King's shaft, the lode has a most promising appearance, and looks likely to improve. We have begun to sink a winze in the bottom of the level for ventilation. As soon as this is completed we shall resume driving the end. There are two stopes in the back of this level worth 6*l.* and 9*l.* per fathom respectively. The lode in the 110 end east is worth 12*l.* per fathom. Two stopes in the back of this level are worth 10*l.* per fathom each. A winze in the bottom of the 110 is worth 8*l.* per fathom. The 120 east is worth 10*l.* per fathom. Two stopes in the back of this level are worth 18*l.* per fathom in the aggregate. Three stopes is the back of the 130 east are worth 8*l.*, 10*l.*, and 7*l.* per fathom respectively. The 140 end east is worth 10*l.* per fathom. Two stopes in the back of this level are worth 7*l.* and 9*l.* per fathom respectively. The 150 end, east of Goodinge's, appears to be entering a better channel of ground, and we look forward to an improvement in this end. The 150, west of incline shaft, is worth 12*l.* per fathom. The rise in the back of this level is worth 10*l.* per fathom. We very much regret to sell the tin at the present very low price; this low price and the difficulties we had to cope with in the early part of the quarter, owing to the breaking of the engine which flooded the bottom levels of the mine, have in a great measure caused the loss on the past 12 weeks' working. We have now nearly completed Hind's engine-shaft to the bottom of the mine after years of labour and at great expense. The old engine will now soon be turned idle, which we shall have for sale, together with 160 fms. of of spare pitwork; as we have already stated, after we have dispensed with the old engine the mine can be worked at less cost, and would, therefore, soon be in a position to pay dividends if the tin market should improve to a moderately high price. The prospects of the mine were never so good, and no further outlay is required for new machinery. We are in a position to increase the returns during the next three months, but it depends entirely on the price of the metal whether we can work profitably or not.—W. RICH, MATTHEW ROGERS, W. RICH, jun.

The CHAIRMAN said the report spoke for itself, while the accounts, showing a debit balance of 1465*l.*, indicated the anomalous position in which the mine had been placed during the three months embraced in the balance-sheet. As far as the mine itself was concerned, its prospects had never been more favourable, nor had its condition for returning tin been so good as now. The loss upon the twelve weeks was to some extent explained by the fact that for one-half the quarter water had been in the mine, making a difference in the output of 12 to 14 tons. Of course, the unprecedentedly low price of tin had also tended much to increase the loss; tin was now lower in price than for many years past. As to the probability of an advance, statistics were favourable, and the stocks at the present time were about the same as 10 years since—12,000 tons—while the consumption was double. Just now large arrivals of wool ships from Australia brought large quantities of tin into the market, but the stocks to be cleared off were by no means heavy. As to the mine, Hind's shaft, which for many years had been a heavy and costly work, was now sunk to the 160; the completion of this important work would enable them to dispense with the other engine, effecting a saving of not less than 100*l.* per mooth, besides having the engine and 150 fms. of pitwork for sale. The committee proposed to make a call of 5*s.* per share; that would realise 1000*l.*, leaving the engine, pitwork, &c., as an available asset, which would more than cover the balance. Everything had been charged up, and the accounts showed the exact financial position of the mine at the date to which they were made up.

The accounts were passed and allowed, and, with the report, were ordered to be entered on the minutes.—A call of 5*s.* per share was made.

The committee of management were re-elected.

A vote of thanks to the Chairman closed the proceedings.

ROOKHOPE MINING COMPANY.

A general meeting of shareholders was held at the offices, Austinfriars, on Wednesday,—Mr. ROBERT WILSON in the chair.

The notice convening the meeting was read.

The CHAIRMAN said this was the ordinary annual meeting, previous to another meeting, to liquidate the old company; and the only thing they had to do was to pass the accounts, showing a balance against the company of 1738*l.* A company has been formed to purchase the mines, and the shareholders in the present company would receive for every three shares one fully paid-up share in the new company. The capital had been subscribed, and there was no doubt sufficient to bring the mines to a successful condition. The report from the manager was very satisfactory. He then moved that the accounts be received and adopted.

Mr. PETER WATSON seconded the proposition. During the last eight months ore had been sold of the value of 2170*l.*, notwithstanding the drought, and the alterations to the machinery, and the severity of the weather at the commencement of the winter season. The report spoke most hopefully of the future. It had been suggested that large portions of the lode were still standing in several of the levels, which could be extracted at once, considerably increasing the returns. The report was read, as follows:—

Feb. 29.—On Thursday, Friday, and Saturday last I was at the above mines, when we let the following contracts:—Four men driving in the back of the adit level, to lay open stoping ground in the top level, at 50*s.* per fathom, worth 15 cwts. of ore per fathom. Four men in the back of the 15, rising into the top sills, at 4*l.* per fathom; the rise to be 10 ft. long. Six men stoping in the back of the 25, at 26*s.* per fathom, worth 24 cwts. of ore per fathom. Four men driving in the back of the 25 to lay open stoping ground, at 35*s* per fathom.—New Contracts: Set the main shaft to sink to the bottom of the shale, about 2 or 2½ fathoms, at 10*l.* 10*s.* per fathom, to nine men. Four men stoping in the back of the 15, at 35*s.*, worth 12 cwts. of ore. Four men in the back of the 25, driving east, and stoping, at 35*s.*, worth 16 cwts. of ore per fathom. Four men to clear out orestuff, and send the same to bank or the dressing-floor. You will see we have fixed or placed 21 additional men, we have four clearing out shaft foot ready for sinkers, who would be on the mine this morning. We propose sinking through the shale for storage for water to the top of 5-yards limestone, securing the shaft on a level with 42 stands, so that we can resume clearing out, and push forward the 42 as quickly as possible into the good bearing ground. Our object in the meantime is to get as much orestuff as will keep the dressing-floors fully employed. We hope when fairly at work to raise ore that will pay costs out of the upper sections and old works until we get the 42 driven up. If we see it practicable shall continue sinking the shaft 20 fms. below the 42; this would lay open three more good bearing sills—5 yards limestone, and 5 and 6 fathoms hazel. I think we have chosen a favourable time for getting good hands as miners. There is very little ore in the bin towards sampling, most of the orestuff broken last month being still laid in mine to stand upon, to save timber, only the poorest being drawn to bank. I have had a practical mining engineer from Darlington inspecting the engines, &c.; some repairs are required, but as we think nothing will take harm for a few weeks we have arranged to leave it alone until finer weather sets in. I have given orders for a supply of timber, &c., which is very much needed at the mine. I trust we are commencing a new and profitable era for the Rookhope Valley Mines.—JAMES BLENKIRON.

Mr. YORK had no doubt that with ample capital the mine would soon be brought into a successful condition.

Mr. PETER WATSON drew attention to the fact that during the last eight months ore had been sold to the value of within 500*l.* of the cost, and that in the face of most imperfect working and exceptional drawbacks and difficulties, and there had only been fourteen men at work.—The accounts were received and adopted.

Mr. YORK had much pleasure in proposing the re-election of Mr. Peter Watson as director. It was most important that shareholders should re-elect Mr. Watson, as his knowledge of the property, and of mining generally, rendered him a valuable acquisition.

Mr. HALES seconded the proposition, which was put and carried.

A special meeting was then held, when, upon the proposition of Mr. CLEMENTS, seconded by Mr. COSTICK, it was formally resolved that the Rookhope Valley Mining Company be wound-up voluntarily.

It was further proposed by the CHAIRMAN, and seconded by Mr. C. J. HILL, that the liquidator or liquidators, when appointed, be authorised to sell and dispose of the business, estate, and effects of the Rookhope Valley Mining Company (Limited) to a company, pursuant to and upon the terms and conditions mentioned in the special resolution passed and confirmed at the several extraordinary general meetings of this company respectively held on Nov. 2 and 3, 1875—that is to say, "That the debts and liabilities of the present company, and the expenses of winding up the same, the whole not exceeding a sum of 2900*l.*, be paid by the said new company; and, in addition, that 5000 full paid up shares in the said new company be allotted, free and without payment, to the liquidator or liquidators for the shareholders in the present company; and, further, that another 5000 fully-paid-up shares be allotted, free and without payment, by way of bonus, share for share to those who subscribe for the remaining 5000 shares, at 1*l.* 10*s.* per share, to be payable in not less than three equal instalments; and to do all such things as shall be necessary for carrying such sale and disposition into effect."

A unanimous vote of thanks was passed to Mr. Murchison for having propounded a scheme of reconstruction at once equitable to the original shareholders and advantageous to those who had come forward and subscribed the necessary capital to ensure success. But for this the property would have passed into other hands, and the shareholders lost all interest in it.

A vote of thanks to the Chairman and directors closed the proceedings.

PARYS MOUNTAIN MINES COMPANY.

The directors, in forwarding this statement of accounts, ending December last, together with the agent's report to the present time, would observe that during the six months embodied in the accounts copper ores to the value of 2981*l.* 6*s.* 1*d.* were sold, and the reserves in the mine have not been diminished. The total returns for six months show 3834*l.* 15*s.* 8*d.*, against a cost of 3767*l.* 2*s.* 5*d.*, or a profit of 67*l.* 13*s.* 1*d.* The assets over liabilities are estimated at 3236*l.* 12*s.* 7*d.* The various points in operation in the copper lodes are valued in the aggregate at 35½ tons of copper ore and 14 tons of sulphur per fathom. The precipitate pits are yielding well, and ochre pits will shortly be cleared out. The 90 cross cut south, towards the great open-cast, has not yet reached the Mona lode, but the agent, as will be seen by his report, has every reason to expect that it is still before them, and may shortly be reached.

CARN BREA MINING COMPANY.

A three-monthly meeting of adventurers was held at the mine, on Monday, Capt. TEAGUE (the purser and manager) presiding. From the statement of accounts it appeared that the labour costs for three months, ending September, were 6180*l.* 10*s.* 1*d.*; the third instalment of the extra month's cost, 500*l.*; merchants' bills, 2780*l.* 19*s.* 10*d.*; carriage, 434*l.* 10*s.* 7*d.*; dues, 174*l.* 3*s.*; Vice-Wardens' assessment, 8*l.* 7*s.* 4*d.*; doctors' pence, 37*l.* 8*s.* 11*d.*; and parish rates, 120*l.* 8*s.*: total, 10,236*l.* 7*s.* 9*d.*—The credits have been, for copper, 5*l.* 10*s.* 7*d.*; for black tin, 7642*l.* 3*s.*; for arsenic, 150*l.*; and for extra carriage, 28*l.* 6*s.* 4*d.*, showing a total of 8374*l.* 19*s.* 11*d.*, and a loss on the three months' working of 1861*l.* 7*s.* 10*d.* At the last meeting the balance in favour of the mine was 2221*l.* 3*s.* 8*d.*, but this is now reduced to 359*l.* 15*s.* 10*d.*

The agents in their report stated that in the Highburrow lode in the 238, driving east of the cross course winze, the lode was of a most promising appearance, and worth for tin 40*l.* per fathom; driving west of the winze in the same level the lode is worth 15*l.* per fathom, and in the winze sinking under the level, east of the cross-course, the lode is worth 2*l.* per fathom. In the 226, driving east of cross-course winze, the lode is worth 30*l.* per fathom. In the Druid lode in the 180, driving east of Monument shaft, the lode is worth 12*l.* per fathom, and in the Druid south lode there are two points each worth 12*l.* per fathom. The lode here in the 105 is opening out well, and the agents think it will become one of the leading lodes in the mine. They are getting in a good position for increasing the returns of tin, which will be made forthwith.

Capt. TEAGUE stated that the deputation appointed at the last meeting had since waited upon Mr. Basset to ask for a reduction of dues while the mine was in its present non-paying state. Mr. Basset received them mostly kindly, listened to all that the deputation had to say, and subsequently Mr. Bolden sent the following reply—"Mr. Basset has carefully considered all that was so ably urged by the deputation from Carn Brea Mine, and desires me to say that, taking into consideration the way in which the mine is being worked, he is willing, in order to meet the adventurers, to reduce the dues, during pleasure, to one-half." (Applause).

In answer to a question from a shareholder,

Capt. TEAGUE stated that with their present appliances their returns of tin would, after a little time, be considerably increased, but he did not anticipate that there would be a material increase during the coming quarter. He added that he was utterly at a loss to know what they they were going to do with tin at its present price. Whether the mines of Cornwall would succumb or not remained to be seen, but at any rate they would die hard. He believed they would shortly see a further reduction in the price of coal, as well as in freights.

The accounts were then passed, and it was unanimously resolved that the cordial thanks of the adventurers should be given to Mr. Basset for his liberality in reducing the dues, Capt. TEAGUE remarking that that gentleman had acted most generously during the depression towards the mines of which he was the lord.

TINCROFT MINING COMPANY.

A three-monthly meeting of adventurers was held at the mine, on Monday, Capt. TEAGUE presiding. The accounts showed that the labour costs to the end of September were 4111*l.* 14*s.* 5*d.*; the merchants' bills, 1727*l.* 0*s.* 7*d.*; carriage, 182*l.* 2*s.* 5*d.*; dues, 300*l.* 3*s.* 9*d.*; vice-warden's assessment, 7*l.* 11*s.* 11*d.*; parish rates, 92*l.* 3*s.* 9*d.*: total, 6420*l.* 16*s.* 10*s.* The credits for black tin and extra carriage were 7985*l.* 12*s.* 5*d.*, leaving a profit on the quarter's working of 1564*l.* 16*s.* 11*d.* A balance of 159*l.* 14*s.* 5*d.* was brought forward from the last account, so that the amount now available for dividend was 1724*l.* 10*s.* 4*d.* A dividend of 5*s.* per share was declared, and Capt. Teague mentioned that three years

ago the same quantity of tin which they were now raising would have given them a profit of 9000*l.*

The agents reported that in the 234, driving east of engine-shaft, in Highburrow lode, the lode was worth 10*l.* per fathom; and in the 210, driving east of Martin's east shaft, the lode was worth 15*l.* per fathom. In Chappel's lode in the 246, driving west of Downright shaft, the lode is worth 20*l.* per fathom, and in the same level driving east of the shaft the lode is worth 12*l.* per fathom. In the winze sinking under the 234, west of Downwright shaft, the lode is worth 100*l.* per fm., and in the 134, driving east of Downright shaft, the lode is worth 12*l.* per fathom.—Dunkin's Lode: In the man engine-shaft, sinking under the 160, the lode is worth 20*l.* per fathom, and in the 160, driving west of the shaft, it is worth 12*l.* per fm. There are several other productive points in the mine varying in value from 8*l.* to 8*l.* per fathom. The mine continues to yield the usual quantities of tin.

The accounts were passed, and the meeting separated.—*Western Daily Mercury.*

NEW PACIFIC.—An extraordinary general meeting was held at the offices, Austinfriars, on Monday (Mr. J. Irving Courtenay in the chair), for the purpose of considering an offer received by the directors of $10,000 (2000*l.*), for the purchase of the Mettacom Mill and appurtenances; also to consider and pass such resolutions as may be deemed advisable respecting the disposal of the purchase-money for the same. It was resolved unanimously—"That the directors be, and they are hereby, authorised to accept the offer made for the Mettacom Mill and appurtenances (of $10,000), and to take steps to carry out the sale." The question as to the disposal of the purchase-money was deferred for the present.

VRON LEAD MINING COMPANY.—The annual ordinary general meeting of shareholders in this company was held, on Monday, at the offices, Cannon-street, under the presidency of Mr. Trew Jegon. The report of the directors stated that the property was situated in the heart of one of the richest silver-lead bearing districts in the kingdom, and the reports of the company's local agent were in favour of important discoveries of ore being made at any moment. The directors congratulated the shareholders upon the passing of an Act of Parliament for the purpose of authorising the draining by means of tunnels, or adit levels, to be driven at a sufficient depth in the rich and extensive mineral district in Halkin and its neighbourhood, within the area of which the company's mines are situated. Upon the works so authorised being carried out the expense of steam-power for the purpose of pumping would be saved.—The Chairman briefly referred to the report, and read letters from the agent at the mine, the contents of which were anticipatory of productive yields being shortly struck.—The report was adopted *nem. con.*, and the retiring directors (Messrs. S. J. Southey and Trew Jegon) having been re elected, the proceedings terminated in the usual manner.

GUNNISLAKE (Clitters).—The four-monthly meeting of shareholders was held at the mine on Tuesday (Mr. J. C. Isaac in the chair), when the accounts showed a credit balance of 2445*l.* 17s. 9d., and a profit on the four months' working of 1142*l.* 9s. 4d. A dividend of 2s. per share was declared. The report of the agents (Capts. Skewis and Seccombe) was a very satisfactory one. The Chairman congratulated the shareholders upon the balance-sheet, especially as all the bills had been charged up, and all the costs included in the balance-sheet were also paid. The directors were anxious not to have an uncertain or temporary but a permanent and real balance, and as they had ascertained from their agents that they would not be able to do quite so well in the next four months as they had in the past, as they would not be in a position to avail themselves of much of the ground laid open, they recommended a dividend of 2s. per share, which they looked forward to keeping up or increasing. Mr. Greenfield thought that as the bankers charged interest if they overdrew they should allow them interest on the balance standing to credit of the company. The purser was directed to communicate with them on the subject. Captain Skewis, in reply to a question from the Chairman, said he had never seen better promise of a permanently rich mine than existed now at Gunnislake (Clitters). From the 34, above the back of the adit, right down to the 140 they had a continuous run of ore ground, and in the bottom of the 140 they had sunk a winze 3 fathoms deep in a lode varying in value, as stated in the report, from 30*l.* to 50*l.* per fathom. They now intended to carry on operations in order to see whether this run of ground continued below the 140, as it had done above. There was every indication that this was so, and should their anticipations prove to be correct, seeing that they had a fine course of ore going down in the bottom of the 188, he did not hesitate to say they would have a mine the like of which was not to be seen in the neighbourhood. The engine shaft had been carried down some 50 fathoms through unproductive granite, but now they had got into quite different strata, and their opinion was that it was very advisable to drive a cross cut right away to Craze's south lode. He believed satisfactory results would thus be arrived at, and they would also be able to prove in depth the value of the other lodes.

[For remainder of Meetings see to-day's Journal.]

Registration of New Companies.

The following joint-stock companies have been duly registered:—

ROOKHOPE LEAD MINING COMPANY (Limited).—Capital 22,500*l.*, in shares of 1*l.* 10s. each. To acquire the business of the Rookhope Valley Mining Company (Limited), an undertaking formed to work the Brandon Walls, Thorney Brow, and Stotsfield Burn Mines, in the parish of Stanhope, Durham. The subscribers (who take one share each) are—W. Jardine, 19, Great Winchester-street, merchant; F. R. Hales, King William-street, solicitor; C. A. J. Reynolds, Southwood Hall, Highgate, merchant's clerk; N. F. Watson, 1, St. Michael's-alley, Cornhill, sharedealer; P. Watson, 79, Old Broad-street, stock and share dealer; W. Hitchcock, John's Villa, Queen's-road, South Norwood; and E. W. Wingrove, Southend House, Twickenham. The directors are—Messrs. E. W. Wingrove, Peter Watson, and Samuel York, of Shifnal, Salop. The terms upon which the property is acquired from the old company are as follows:—After paying the debts of the old company, to the extent of 2000*l.*, including liquidation expenses, it is intended to allot 5000 shares in the new concern to the old shareholders. An additional 5000 shares will also be allotted to those who subscribe for the remaining 5000 shares at 1*l.* 10s. each. The qualification for a director is the holding of 100 shares, and the remuneration will be 5*l.* per annum each, with a further sum of 50*l.* per annum if 15 per cent. is paid.

DEE GUNPOWDER COMPANY (Limited).—Capital 100,000*l.* in 10*l.* shares. To carry on the manufacture of gunpowder at Northop, in the county of Flint. The subscribers (who take one share each) are—C. G. Mott, The Park, Birkenhead; C. J. Reed, C.B., 74, Gloucester terrace, South Kensington; J. Galloway, jun., Knoll Mill Ironworks, Manchester; B. Gibson, 8, Cook-street, Liverpool; J. T. Emmerson, Peover, Knutsford, Cheshire; J. Irvine, 17, Water street, Liverpool; J. C. Jones, 10, Cook-street, Liverpool.

MOULDEN WATER PAPER MILL (Limited).—Capital 50,000*l.*, in 5*l.* shares. To acquire Moulden Water Mills, and to carry on business as paper makers, &c. The subscribers (who take one share each) are—J. Longton, Rose Cottage, Blackburn; E. Richardson, Blackburn; T. A. Ashden, Blackburn; W. Gourlay, Blackburn; J. Hargreaves, Blackburn; J. Longton, jun., Blackburn, and W. Fletcher, Blackburn.

FISH GUANO COMPANY (Limited).—Capital 30,000*l.*, in 5*l.* shares. To acquire letters patent for making manure, &c. The subscribers (who take one share each) are:—R. E. Farmer, 25, Moorgate-street; G. F. Wilson, 60, Fore-street; T. Constable, 23, Arlington-square N.; H. Cranfield, 16, Great Swan alley, E.C; P. Sleigh, 5 Suffolk-street, Islington; J. Diplidge, 95, Guilford-street, W.C.; G. Eastham, Flaistow.

CHEQUE BANK (Limited).—Capital 100,000*l.*, in 10*l.* shares. This is a reconstruction of the Cheque Bank. The subscribers are—J. F. Jamerson, 9, Queen's gate, 150; A. G. Dallas, 10, Trevor-terrace, S.W., 100; J. E. Taylor, 22, Queen's Gate Gardens, 100; J. Hertz, 45, Albermarle street, 100; W. Nash, 12, Queen-street; J. A. Marks, 191, Strand; W. M. Doughty, 8, Old square, Lincoln's Inn, 100.

FARNWORTH LAND AND PROPERTY COMPANY (Limited).—Capital 20,000*l.*, in 5*l.* shares. This is a Lancashire Land Company. The subscribers (who take 10 shares each) are—G. W. Bardsley, Bolton; J. E. Burton, 177, Islington, Liverpool; C. Walker, 173, High-street, Oxford road, Manchester; T. W. Taylor, Bolton; G. Gerse, Bolton; P. Liphott, Bolton; and J. Gooden, Bolton.

ANGLO-FRENCH VOLCANO HYDRAULIC GOLD COMPANY (Limited).—Capital 225,000*l.*, in 10*l.* shares. To acquire by agreement with Mr. E. Derbec, or otherwise, the canals, hydraulic works, veins, lodes, &c., in Volcano, Amador County, California, containing about 580 acres of land, and 1·7 miles in length of canals, &c. The subscribers (who take one share each) are—J. L. Elkin, 5, Great Winchester-street, accountant; A. Wilkin, 103, Camberwell New road; Alphonso de Saligny, 50, Rue Jacob, Paris, landed proprietor; H. Godfrey, Gray's Inn, solicitor; A. Macfadyer, 6, Warwick-court, Gray's Inn, stockbrokers' clerk; J. H. Wilkin, 58, Threadneedle street, brokers' clerk; W. W. Wright, 142, Richmond-road, accountant. The directors are not yet appointed, but their remuneration is fixed, as follows:—They are to receive until the annual general meeting in 1878 the sum of 1500*l.* per annum, and after that time they will be paid 2500*l.*, together with 1 per cent. per annum upon all dividends over 10 per cent.

PITANGUI GOLD MINING COMPANY (Limited).—Capital 25,000*l.*, in 1*l.* shares. To acquire mining rights in the Empire of Brazil, and also the gold mines knowo as the Pitangui Mines, the Agua Quente, and the Morro das Almas Mines, near the town of Catas, Brazil, described in an agreement made between E. S. Holland, C. M. Holland, R. B. Perring, J. D. Dennis, and A. P. Fletcher, of the one part, and J. S. Moore, on behalf of the company. The subscribers (who take one share each) are—Edward Swinton Holland, 20, Tower Buildings, Liverpool, merchant; C. F. Carne, 52, the Albany, Liverpool, warehouse keeper; C. M. Holland, Chester, civil engineer; A. P. Fletcher, 24, Lenwick-street, Liverpool, solicitor; C. E. Steven, Liverpool, solicitor; J. H. Dennis, Oriel Chambers, Water-street, Liverpool, metal broker; and W. Williams, 95, Park road, South Berkenhead. The directors are—E. S. Holland, C. M. Holland, J. W. Denn s, and A. P. Fletcher, the qualification being 50*l.* shares. In the event of the company being established paid-up shares to the value of 6000*l.* will be issued in proportions to Messrs. E. S. Holland, C. M. Holland, R. B. Perring, J. H. Dennis, and R. P. Fletcher.

ABERBEEG COLLIERIES (Limited).—Capital 50,000*l.*, in 1*l.* shares. To acquire the Peny-Van Colliery, in the parish of B-dwelty, county of Monmouth. The subscribers (who take one share each) are—W. J. Nelson Neale, Greenpark, near Dartmouth, barrister; W. W. Hastings, 2, Lorraine-road, Holloway, accountant; E. Reed, 35, Finsbury-circus, agent; E. H. Schubert, St. Swithin's-lane; E. D. Smart, 30, King Henry's road, N.W., gentleman; W. Hope, Laurel House, Wimbledon, surveyor; J. Zalmanseln, 62, Cornhill, merchant. The qualification for a director is 100 shares, and the remuneration is to be 500*l.* for the first year.

SOUTH DARREN MINING COMPANY (Limited).—Capital 9000*l.* in shares of 1*l.* 10s. To acquire the South Darwen Mine, in the parish of Llandadarnfawr, Cardigan. The subscribers (who take one share each) are—W. Jardine, 19, Great Winchester-street, merchant: Alfred Cornwall, 5, Douglas-road North, accountant; W. Smith, 12, Carlton Villa, Portslade, gentleman; F. R. Hales, 74, King William street, solicitor; C. A. J. Reynolds, Southwood Hall, Highgate, merchant's clerk; W. Bastable, 48, Portland road, W., merchant's clerk. The directors are Messrs. W. Jardine, G. Blogg, and Martin, all of 19, Great Winchester street, and they will be empowered to appoint two additional directors each during the first year. The remuneration will be 50*l.* per annum each.

NORTH DERBYSHIRE BRICK AND TILE MANUFACTURING COMPANY (Limited).—Capital 20,000*l.*, in 2*l.* shares. To acquire the business of the North Derbyshire Brick and Tile Manufacturing Company (Limited).

The following are marine insurance companies:—Robin Hood's Bay Insurance Company (Limited), by guarantee; Robin Hood's Bay Indemnity Insurance Company (Limited), by guarantee; Robin Hood's Bay Freight and Outfit Insurance Company (Limited), by guarantee; Whitby Marine Insurance Company (Limited), by guarantee; Whilty Freight and Outfit Insurance Company (Limited), by guarantee; United Kingdom Mutual Steamship Assurance Association (Limited), by guarantee.

FOREIGN MINES.

DON PEDRO.—Letter from mine captains, dated Jan. 22: The water is in fork, and the 35 fm. level cross cut continued. We have taken two or three samples from the upper part of breast of the cross-cut which showed a few fine speck of gold, so we think we have met with the under part of canoa shoot of lode. Water drawn from the mine still amounts to 21·02 cubic feet per minute; no increase of surface water. Operations throughout the mine are going on satisfactorily. In explorations in mine and at surface we have not met with anything encouraging.

Mine Captain's letter, dated Jan. 31: The 35 cross-cut has been suspended for seven days in consequence of not sufficient surface water. The first five days the water rose about 7 ft. above the bottom of the 35. Since then we have had some heavy rain, which increased the water at surface, so that we forked out the 7 ft. of water in about 25 hours. The 35 cross-cut was resumed on the 29th, and still continued. We have put a force to re-open the middle level (under the adit level) in order to explore the north ground on the dip below what was first called the No. 7 shoot, but was afterwards considered to be a part of No. 8, about which, however, there is some doubt. All works in the mine are going on satisfactorily. No box work avainable. The surface water continues as it has been for the last two or three days. We hope to commence sinking in a few days. Water drawn from the mine is 21·02 cubic feet a minute. The exploration in mine and at surface nothing new to report.

— Telegram from Rio, March 1: Underlie lode met with; sinking resumed.

SANTA BARBARA (Gold).—Mr. Hilcke, Pari, Jan. 24: No change of note had taken place in the appearance of the lode during the past fortnight, it being much the same as when last reported on. The attendance of native labourers had been rather slight so far during the month, owing to the many holidays. The water supply had increased again a little, there having been some few showers of rain.

RICHMOND CONSOLIDATED.—Cablegram from the mine at Eureka, Nevada: Hall, London: Week's run, $46,000.

R. Rickard, Feb. 7: The No. 1 stope, in the back of the 600, is about the same as last week. The south-east end is still looking very well. The No. 2 stope, in back of the same level, is looking a little better; for the last few feet rising the ore seems to widen and improve in quality, and the pitch is very flat. I have suspended the cross-cut in the 500 until we can see where the pitch of the ore will take it at a level with the 500. As soon as we have ascertained this we shall resume the cross-cut in the direction of the ore, which will be indicated by the rise from the 600. There is nothing seen in the 600 cross-cut. We have suspended drifting, and are now rising the communication with the stope above for an air passage. Ventilation in the stope has been very bad, but by making this connection it will give sufficient air, and enable us to rise to the 500 without any difficulty. In the deep winze below the 600 we have not drifted much since last week; what we have drifted is in good ore. We have cut a station and began sinking another winze for the 700. The 700 drift is being pushed on with all possible speed; the ground is very hard, and slow progress is being made. Workings on the west side of the hill are looking very well. We are preparing to sink a winze from the drift we made in ore; this ground is looking very promising; the quality of the ore is good, and the dip of it continues to be still in the right direction for ore ground. In a few weeks we shall be in a position to know in what direction to cross-cut for this ore body from the Lizette Tunnel extension; until that time I have suspended drifting in the Lizette. The water in the shaft does not appear to increase. We shall have all out and ready to begin the 800 station in about two days. This would have been done several weeks since had we not been prevented from hoisting the water. I am having a tank fixed to receive the water from the shaft, so as to make use of it for steaming purposes. The three furnaces were in full blast the whole of the week, with the exception of the time lost in patching. We have been using a mixture of fuel—coke and coal. If it had not been for the constant burning through of the furnaces this mixture gives very good results. The No. 2 has been in blast 157 days, the longest run ever made with any furnace in this place with one lining. The roads are in pretty good condition again for charcoal hauling, and the supplies have increased during the past week.

Thos. Westbury Hall (secretary), March 3: A rumour having been circulated to the effect that there was only sufficient ore in the mine to keep the furnaces running for three months, the directors sent a cablegram requesting a statement of reserves, and received the following in reply:—"Report utterly false. Await Price's second report.—Probert." "Reserves last reported on not materially diminished; ore body between sixth and seventh levels untouched. General prospects excellent.—Rickard."

FRONTINO AND BOLIVIA (South America).—The directors have advices from their manager, dated Jan. 12, accompanied by a remittance of gold valued at 2628*l.*, the produce of the mines, and from gold purchased at the mines, for the month ending Dec. 20. Produce for December last, 640 ozs. of gold dust, from 1378 tons of mineral; average yield per ton, 9¼ dwts.; and 440 ozs. of gold purhased from tributers: together valued at 2628*l.* Cost at the mines, at Medellin and in London, 1030*l.* 18s. 4d.; cost of gold purchased, 822*l.* 6s. 8d.; together, 1853*l.* 5s.; leaving a profit of 774*l.* 15s. In addition to the monthly cost of 1853*l.* 15s., 56*l.* has this month been expended on capital account. Although the produce from the mines for the month of December falls short of what the directors had anticipated, nothing can be more satisfactory than the condition in which Mr. Robert White reports the mines to be. Mr. R. White says—"We have reason to be satisfied with the results of 1875, and to trust that 1876 will bring us even better success in our efforts to establish the company's property upon a firm, permanent, and prosperous basis."

ANTIOQUIA (Frontino).—The directors have received advices from their manager, dated Jan. 12, accompanied by a remittance of gold, valued at 153*l.*, the produce of the mines for the month of December. Mine cost at Frontino, and expenses at London and Medellin, 287*l.*: produce, 52½ ozs. of gold dust, from 156 tons of mineral (average yield per ton, 7 dwts.), 153*l.*: loss, 134*l.*

TOLIMA.—Advices report that owing to the water having been cleared from the lower levels of the Frias Mine only towards the latter part of December, the returns are unusually low, being $3581, obtained at a cost of $5849, thus showing a loss of $3868, or 617*l.* odd. On the other hand the small hydraulic machine had been got to work on the Alto ridge four days before the date of the despatches, and when the supply of water reaches 120 in. measurement satisfactory results are anticipated, but at present the supply is inadequate for more than two hours' run a day.

GOLD RUN.—On March 1 the company received a first remittance of 500*l.* on account of profits from washing through the new tunnel.

SAN PEDRO (Chili).—R. M. Kitto, Jan. 1: New Shaft: The 150, driving south of west from the shaft, by six men, is greatly improved in appearance, and we may expect a good manto of ore from one day to another; it is driven 35 metres from the shaft and 10 metres through the manto, and is producing good stones of bronces. A winze in the bottom of the 135 is sunk 29·50 metres; this is now suspended, and we hope to communicate here with the bottom cross-cut about the end of the month. A stope in the back of the 135 will produce 4 tons of 25 per cent. per fathom. The 122, driving south of shaft, is producing good stones of native copper. The 88, driving south of west of the new shaft, is producing good stones of ore.—Cuba Mine: A cross-cut driving south, by three men, is in hard ground. A chiffon sinking from surface, by three men, is producing ore of 16 per cent.; we expect to communicate this with the cross cut by the end of the month, and we shall then raise ore from here, which we hope will greatly assist in our returns.—Santa Helena Mine: The tributer has been dressing up his ore since my last, therefore the pitch is without change. I am glad to state that the engine and everything connected with the mines is in good working order.

R. M. Kitto, Jan. 14: New Shaft: The 15 cross cut driving south west of shaft, by six men, is producing stones of bronces, but not sufficient to value. The stope in the 135 is suspended on account of its becoming poor. The 122, driving south of shaft will produce 1 ton of 25 per cent. ore per fathom. In the 88, driving south of west from new shaft, we cut a splendid manto of 50 per cent. ore two days ago; it is all the end wide, and as yet we have no wall. I have never seen a prettier lode of ore. We cannot tell the width of it, so, therefore, I must defer stating the value of it until the next report. A level north from new shaft at the No. 3, or 36 fm. level, is being driven to cut any shal ow bunches of ore, and to intersect the mantos from the Cuba Mine that run in this direction. The ground here is favourable.—Cuba Mine: The cross cut driving south by three men, is again producing good stones of ore, and the ground has become more favourable for driving. We are likely to cut a good manto of ore here shortly. A chiffon sinking from surface by three men, to communicate with the last named cross cut, is producing good stones of 20 per cent. ore. This will open out a good piece of stoping ground when communicated with. The Santa Helena and San Antonio Mines are suspended for the present. I am glad to state that the engine and everything connected with the mines are, both underground and at surface, in good working order. We have got about 80 people employed here underground and at surface. The work in every department is being carried on quite satisfactorily.

EXCHEQUER (Gold and Silver).—Mr. Lewis Chalmers, Feb. 7: The team with the conveyors has arrived, and gone back for the balance. The carpenters are now putting in what has come to hand. I have got the road opened to the mine, got my pump pipes and lumber, and am hauling ore on the sleigh. The opening of the road was quite an undertaking, and took four days of all hands. Had I not been obliged to get up my pump pipes I should have left it alone till spring. Some fine ore coming out of both the 200, 300, and the 140 (winze) is again looking well. I am busy with my annual balance. In haste to catch the post, which is very irregular, and on snowshoes.

MALABAR.—G. B. O'Reilly, Jan. 19: Mine: I have read most attentively the board's remarks under this head, and am much pleased to see that they had resolved on giving the eastern banks a fair trial; their resolution to do so has since been confirmed by receipt of the telegram from London, and we shall now at once proceed to open our eastern cut as quickly and economically as possible. Anderson's work has gone far to prove that the good ground tends in this direction with a steep dip.

MALPASO.—Jan. 18: Working of Mine: When I last wrote we had started for the third time, since when we have lost another 36 hours by the pipe being broken by a large cave from the high bank, and also about 12 hours by further repairs necessary to the ditch. Now we are again fairly going ahead with a first-rate head of water and gravel looking better than ever, easy to wash, but troubled with a heavy band of exceedingly hard cement, in some places 4 or 5 ft. thick. This comes down in lumps of :00 or 300 cubic ft., and requires a large staff of peons to keep cleared away. We have tried blasting it, but without any great amount of success. However, it does not seem to be getting any worse, and our face of gravel is getting larger, so that there is every reason to expect that this run will come up to, or perhaps exceed, the last two runs. With this prospect before us I am more of opinion than ever that it would be premature to attempt anything in the way of re-opening just yet. The ditch and sluice are in better running order than they have been for some time, and until all expenses connected with the new ditch have come to an end we had better by far keep on as we are doing.

BATTLE MOUNTAIN.—Capt. Richards, Feb. 3: In the 330, north of the new shaft, the lode is of large size, producing some good ore and a good deal of concentration ore. Near Tonkins's winze some very rich ore has been raised, although the ledge is small, but very promising. In the back of the 260, north of the new shaft, the lode is of a very promising character, and produces some rich ores in red oxide of copper. The new concentration works at Willow Creek are progressing most satisfactorily. Last sale of ore at San Francisco assayed 44 per cent.: 1130 sacks are now ready for shipment.

BENSBERG.—C. Craze, Feb. 28: Victoria Shaft: Having driven at the 22 about 6 ft. east of this shaft on the branch of ore met with in bottom of same, and found that it does not make up more than 2 ft. in the level; we have suspended this drivage, and commenced to cross-cut north to intersect the ore part gone in that direction, as seen higher up in the shaft; the exact distance we shall have to drive here to do this cannot at present be ascertained, as it will depend on the dip or underlie of same. We have met with a cross-head (or branch) in the 14, west of this shaft, in the last week, which has thrown the lode out of its former direction. On Tuesday last I put the men here to drive north, and I am pleased to say that we have discovered what no doubt is the foot or south wall of the lode, from which we have broken some good stones of ore; we shall continue to cut through it, and I have no hesitation in saying that when cut through it will be found equally as valuable as it was to east of cross-course. In the 14, east of shaft, we have some fine rocks of ore coming out of bottom of the level, which looks promising for the 22 under this point; altogether the lode here produces about 1½ ton of ore per fathom. We have now commenced to cut north through the lode here, to see if there may still be a better part in that direction.

UNITED MEXICAN.—Edward Hay, Jan. 24: Mine of Jesus Maria y José: In this mine there seems to be some improvement, notwithstanding the low leyof the ore. There are now 52 buscones at work. Two workings are in very fair ore, but the heat is so great that we began last week a small work below them to ventilate these points, which seems to promise a good class of ore.—New Concern, Adit of San Cayetano and Mine of Buenos Ayres: The advance in both ends of the adit, east and west, owing to the continued hardness of the rock, has been retarded. The distance driven in the two weeks ending Jan. 22 was 11½ metres. Traces of silver continue to be met with in both ends. In the old workings of Buenos Ayres very little has been done as regards throwing down ore; the clean ore averages about 5 maros per monton, and the seam of better ore has only given here and there a fair assay, and is now entirely in carbonate of lime. We have at last cleaned out the pozo, and have begun sinking. During last week about a carga of ore of fair appearance has been thrown down, and the miner states that the good appearance continues downwards.

LUSITANIAN.—Feb. 22: Palhal: The lode in Taylor's engine-shaft, below the 180, is 7 to 8 ft. wide, composed of quartz. At the 110 cross-cut, south of Basto's lode and east of River shaft, we have a little branch in the end composed of quartz and country, but it is going too fast south for our lode.—Levels on Basto's Lode: The lode in the 180 west is 2 ft. wide, unproductive at present. The 170 west is 3 ft. wide, yielding ¾ ton of ore per fathom. The 150, east of River shaft, is also 3 ft. wide, composed of quartz. The lode in the 150, west of Taylor's and west of the slide lode, is very small, but it has a little ore in it. In the 90, east of River shaft, the lode is 3 ft. wide, composed of quartz, mundic, and copper ore, mixed with cobalt, but not in quantities to value. In the 70, east of the above shaft, we have been taking down a branch that apperred in the north side of the level, but it is looking very poor. The lode in the 50, West of Taylor's and west of the slide lode, has a very regular wall, but it is of no value. The mill lode, at the 70, is nearly 1 ft. wide, composed of soft country; the ground about the lode is very unsettled. The caunter lode at the 150, west of Taylor's, is 1½ ft. wide, composed of quartz and stones of copper ore, mixed with cobalt. In the 28, east of River shaft, the lode is 4 ft. wide, composed of quartz and spots of lead.—Carvalhal: The branch at the 60, west of the cross-cut, has a better wall, but there is no ore of value to be seen.

[For remainder of Foreign Mines, see to-day's Journal.]

THE ALMADA AND TIRITO CONSOLIDATED SILVER MINING COMPANY (LIMITED).

MINA GRANDE.

Dec. 30, 1875: On the morning of the 25th inst. your telegram reached here, dated San Francisco, Dec. 10, and worded as follows:—"Recommend cross-cut on twelve fathom Mina Grande." On the previous night we commenced to break the ground to the east, and the receipt of your message decided me on trying a cross-cut in the direction indicated. In the Mina Grande we last week commenced to cross-cut to the east; we are now in 3 ft., and have narrow strings of ore and fair-looking spar, but nothing like solid metal, still the ground is better for ore than we had to the north, and it also contains more water. In another week I hope we may have some more decided change to report. This week a rise was started over where we sunk on the ore in the north end of the tunnel some time since, and we have some pretty solid ore in the back, but the ground here has deceived us so much that I am loth to say more until we explore further.

Jan. 6: Underground during the past few days we have improvements, although not in the Mina Grande, where we are most anxious to meet with ore. The cross-cut east progresses well, but the ground is not promising, being of the limey nature of the ground to the west. We are still driving east, as we still have the water to the east of us, and it is perhaps better to cross cut the lode to the wall, in order to make perfectly sure before driving further to the north. In the rise we are putting up over the vein found near the north-east of the tunnel we have better indications for ore.

Jan. 13: In the Mina Grande we are still cross-cutting to the east, and the most I can say is that the ground looks more kindly for ore, and that, as we cut more water the further we get to the east, we have hopes of cutting the lode in that direction. We are now directly under the main body of ore in the tunnel, but have nothing more than small balls of ore. The rise in the north end of the tunnel, back in Mina Grande, although not in ore worth saving, gives some hopes of the ground opening out. We have now 3 ft. wide, of fair-looking spar, with now and then spots of ore.

Feb. 8: The directors received the following telegram this day:—"West cross-cut Mina Grande twelve more." It is believed that the latter word should be "in ore."

PROVIDENCIA.

Dec. 30: During the week nothing worthy of mention has taken place, except that in the new east lode we appear to have ore still to the east, strong branches of ore occupy what should be the footwall, and there is a strong flow of water out of the eastern side, giving us reason to expect ore outside of what is the east lode proper. The ore in this lode contains more zinc than we have met with in any part of the mine, and it is only the more coppery parts that really yield the silver. In the 32 fm. level (also in the Providencia Mine) we are stoping again, but with no improvement, the ore does not appear to make upwards, and as soon as we can we purpose sinking on the ore in the level to ascertain what it is like as it goes down.

Jan. 6: In this mine the only change of note is in the new east lode, which has much improved, being more solid, and the ore of a better class. I am in hopes of finding the lode to the east of the black ore we are stoping in the Tunnel level further to the south, and which we have worked up from the 10 fm. level. As the lode has now turned to the east, and is parallel to the back of the slide, it has a better chance of holding for some length.

Jan. 13: In the 32 north we have commenced to sink a little on the green ore to prove it for a few feet in depth, or as far as the water will allow. The Purisima is now the only place from which we are taking green ore, and the supply we are enabled to draw is, of course, very limited indeed. The ore still keeps up an average of from $37 to $45 per ton.

LIXIVIATION.

Dec. 30: We have lixiviated the first charge of ore roasted, with the addition of 10 per cent. of mundic, and find the result very much better in every respect. The ore roasts much more perfectly, and lixiviates in much less time than before. We have not yet got the precipitate in such a form that we can weigh it to know our gain over the other parcels tried, but the tailings are already poor comparatively, giving only $15 per ton by assay, and with more time we can render them poorer still. At present they have only filtered for 36 hours, while the old tailings of roasted ore, without the addition of mundic, would not part with the silver under five days, and then very imperfectly.

Jan 6: We are now, with the addition of 7 to 8 per cent. of mundic, producing the tailings (of ore worth $60 to $70 per ton) sufficiently poor. By assay the tailings are worth only $8·60 per ton, and considering the extremely refractory nature of the ore, I think we may look on the above as a fair result; nevertheless we hope when the furnace hands are more experienced to do better. We are now building a vaso (Mexican refining hearth) to refine the produce. If we can obtain sufficient mundic at a reasonable price I do not think there remains any difficulty to be got over in the beneficiation of any of the black ore suitable for roasting.

CORNISH MINE SHARE MARKET.—There has been but little business doing in the Share Market during the week. At Tincroft meeting, on Monday, a dividend of 1500*l.* (5s. per share) was declared. The accounts showed a profit on the quarter of 1564*l.* on 180½ tons of black tin. The great difference in the cost of working mines some little time ago, when coals, iron, and labour were so much dearer than now, is strikingly shown by the dividend of 5s. on Monday, which is precisely the same amount as was paid when Straits tin was 95*l.* to 96*l.* per ton, rather more than 20*l.* per ton higher than at the present time. This speaks volumes in proof of the statement that mines are now being worked cheaper and more economically than they were some time ago. Dolcoath, too, paid the same at the last meeting as it did when tin was more than 20*l.* higher. The cost of dressing tinstuff at Dolcoath, Tincroft, and Carn Brea now amounts to about a little under 4s. per ton, while Capt. Evans stated that he would soon be able to dress West Basset tin at rather under 3s. per ton. It is a very different matter for Australia, now that she has to compete with Cornwall at present price, from when Straits tin was realising from 140*l.* to 150*l.* per ton. At Carn Brea meeting, on Monday, a loss of 1981*l.* was shown. A vote of thanks was given to Mr. Basset for liberally reducing the dues one-half. The report is very favourable.

The following are the closing prices:—Carn Breas declined since the meeting to 28, 30, at which they close. Cook's Kitchen flat, at 3½ to 4. Dolcoath declined to 36, 37. East Pools dull, and also close weaker, 14 to 14½. Killifreths not so much enquired for, but a few shares have changed hands at 17s. to 19s. South Carn Breas continue quiet at 25s. to 27s. 6d.; the meeting is called for Thursday, when a small call is generally expected. South Condurrows steady at 4½ to 4¾. South Crofty, 18 to 19; the recent improvement is said to be still looking well. Tincrofts keep steady since the meeting at 18 to 18½, ex div. West Basset neglected, 4¼ to 5¼. West Seton, 36 to 38; we hear of no change in the 140. West Frances, 7 to 8. West Tolgus have declined to 63 to 65. Wheal Agar, 2 to 2¼. Wheal Basset, sellers, 10 to 12½. Wheal Jane, 2¼ to 2¾. Wheal Unity Wood, 30s. to 3·s. 6d.

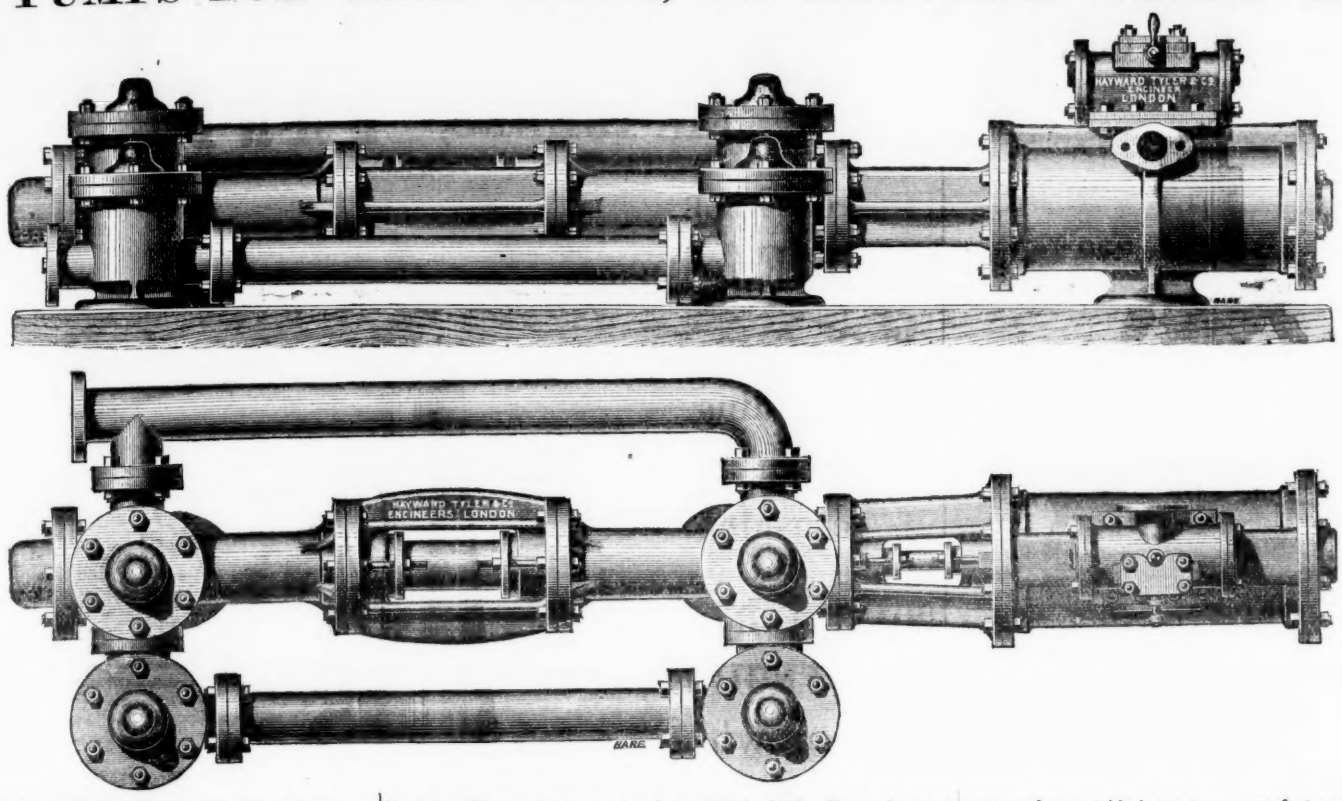
PERRAN WHEAL VIRGIN.—It was hoped that the sale of the engine and materials of this mine would have covered the liabilities, but having failed to do so a call of 10s. per share has been made through the Stannaries Court on all settled contributories.

WEST POLDICE.—This mine still continues to open out well. Since the meeting, held on Feb. 1, they have sold and got on the floors about 800*l.* worth of tin and copper. In the bottom level (the 42 end east) the lode is worth 70*l.* per fathom for tin. They will have to drive a few fathoms more to intersect the copper lode which is standing south of the tin lode, and great results are expected here in this level, as they have gone through a good course of ore in the level above for 50 fms., and still looking well.—*West Briton.*

GRINDING AND POLISHING METAL.—The invention of Messrs. GOLDSWORTHY and BARLOW, of Manchester, consists in driving emery wheels or other grinding and polishing instruments by means of friction discs and pulleys. In performing the invention they make use of a large friction disc, keyed on the driving shaft, which is provided with fast and loose pulleys. The emery wheels of other instruments to be driven are mounted on shafts placed at right angles to the driving shaft, and a friction pulley is fastened by a sliding key to each.

HOLLOWAY'S PILLS.—Medicine for the Spring.—Diseases latent in the system throughout the winter will manifest themselves on the approach of warmer weather unless the blood be freed from impurities and the body generally from noxious matters. Holloway's pills have long since established the highest reputation for the full and efficient manner in which they accomplish this purifying purpose. These excellent pills search every organ, pervade every tissue, and successfully grapple with all deleterious substances, either by neutralising them or expelling them. Holloway's medicine promotes comfort, cheerfulness, health, and strength. The medicine is admirably adapted for the weak and delicate, whose frames are relaxed, whose nerves are unstrung, and whose digestions are upset alike by spring's variations and summer's heat.

STEAM PUMPS FOR DEEP MINES, BY HAYWARD TYLER AND CO.



STEAM PUMPS FOR DEEP MINES, BY HAYWARD TYLER AND CO., OF LONDON.

The Luton Works of the above firm were visited on Friday last by some gentlemen interested in Steam Pumping Machinery for Use in Coal Mines, to witness the trial of a couple of their well-known "Universal" steam pumps. The engines in question vary somewhat from the usual type, inasmuch as the long piston containing the slide-valve is dispensed with, so far as the interior of the cylinder is concerned, and is replaced by a piston of ordinary construction. The slide-valve is placed on the outside, and consists of a piston of the form peculiar to the "Universal," but having ports cast on the under side. It is actuated in the same way as when placed within the cylinder—the small internal slide being set in motion by steam taken from the main cylinder on the piston passing over certain ports.

The pumps tested on Friday were two in number—one having a steam-cylider 12 in. diameter, and pump-ram 5 in. diameter, with 26-in. stroke. It is intended for a colliery in South Yorkshire, and its duty will consist in raising from 4000 to 6000 gallons of water per hour to a vertical height of 240 feet, with steam of 30 lbs. per square inch. When tested it worked with the greatest ease and precision, under a steam pressure of 50 lbs., and a water pressure of 250 lbs., or equal to some 500 feet column, at 15 to 20 strokes per minute, at which speed the metal valves were perfectly noiseless. The pump valves are of the mushroom type, and are fitted with springs and guides. One peculiarity in this pump seems to be that should it accidentally get upon air it will not run away. This property was shown at Taunton last, at the summer meeting of the Royal Agricultural Society, when the first of this type was exhibited. Upon air being admitted into the suction-pipe the pump made some irregular strokes, but cushioned itself so perfectly as to almost pull itself up. The larger pump tested has a 15-in. steam-cylinder and 7-in. ram, and is capable of raising 12,000 gallons of water per hour 300 feet high.

The chief advantages claimed for the conversion of the long steam-piston into an outside slide-valve are that of obtaining at least double the length of stroke, increased facility of starting the engine by means of an outside lever, a more perfect cushion to the piston, and, lastly (which is, perhaps, most important of all), a "rest" at the end of each stroke, allowing time for the pump valves to fall quietly. This is accomplished in an exceedingly simple manner, but no less ingenious. The pump is fitted with a ram or plunger, in contra-distinction to a piston, fitting the pump barrel—hence it can be packed as required. On the whole, it is one of the most simple and efficient machines we have yet seen for this class of work.

In wandering through the new works at Luton we observed extensive stores, which are intended to supplement those now in course of construction at Whitecross-street. They are, moreover, well stocked, and contain most useful articles, such as stop-valves for both water and steam foot-valves, horizontal engines and boilers, some of the engines being fitted with Rider's automatic expansion valve. "Universal" pumps of all sizes, from 3 to 26 in. steam-cylinders, capable of raising immense volumes of water. We also observed a large assortment of house and deep well pumps, and soda water machinery of the most approved form.

ON MACHINE BORING IN SHAFT SINKING.

The following results have been published as obtained by the use of Sachs' boring machine in a new sinking at Tromberg, near Steele, in Westphalia. The shaft, measuring 14·8 ft. by 16·4 ft., was sunk in slate and sandy shale to a depth of 241·2 ft. in six months, or an average of 40·2 ft. per month, using six machines. The borers of best Styrian steel, required sharpening after boring from 3·28 ft. to 5 ft., and under the most favourable conditions a machine held out from 13 to 22 shifts, without requiring to be removed for repairs. The proportion of machine to hand bore-holes was as 2·72 to 1. The former averaged 3·9 ft. in depth, and from 1·2 in. to 1·8 in. in diameter, while the latter was 2 ft. deep and 1 in. broad. Blasting was effected with dynamite and safety-fuse. The total number of hands employed at the shaft bottom, including those employed in filling tubs with rock, was from 20 to 24. The cost per foot of this sinking was at first 5*l*. 8s. 9d., but was subsequently reduced to 4*l*. 10s., exclusive of the cost of drawing the rock to the surface.

With the same machine at the Carolus Magnus Colliery, near Berge Borbeck, the average result obtained in driving a level through similar rocks, 8·2 ft. high and 7·2 ft. broad, was 31·5 ft. per month over a period of two years; but no further details are given.

—Oest. Zeitschrift für Berg und Hüttenwesen.—H. B., *in Proceedings of the London Institution of Civil Engineers.*

ON THE USE OF BORING MACHINES AT SCHEMNITZ.

The deep adit level known as Joseph II.'s adit at Schemnitz, which was commenced in 1782, is intended to be of a total length of 17,827 yards, or about 1420 yards longer than the St. Gothard Tunnel. Of this length 15,320 yards have been driven by hand labour during the course of 92 years, leaving two sections unfinished, one of which is 1504 yards and the other 1000 yards long. In the latter section the use of machinery was commenced experimentally in the year 1873, and was continued at intervals during the following year. In the first series of experiments one machine of Sachs' construction was used, the average depth of the bore-holes being 1·3 foot, which were charged with dynamite, and fired by means of fuse. The average daily advance of the level, which was 8·5 feet high and 6·9 feet broad, was 2·1 ft. In the second series two machines were used, and the charges were fired by electricity; the result was a daily advance of 3·28 ft., the rock being, as in the first series, a moderately hard trachyte (rhyolite). In the third series two machines on an improved frame were used, the holes being 2·3 ft. deep; the advance was 9·8 in. per day in greenstone. In the fourth series, when the men were becoming better acquainted with the use of the machines, the average length driven per day was 4·8 ft. Great difficulty was at times experienced in the use of the electrical apparatus from misfires, especially when the air in the level was highly charged with moisture. It was found most convenient to have two machines, which were used alternately, and only taken into the mine when the holes were loaded and ready for firing. It was also considered desirable not to fire more than 12 holes at one time.

In order to obtain a basis for comparison with hand labour, a fifth series of experiments was made by 12 selected miners, working 4 at a time, 8-hour shifts, under continuous supervision; when it was found that 12 men in 4 days advanced the level 11·5 feet, equal to 2·9 feet per day, thus producing somewhat less effect than a single machine.

Although the latter works at a disadvantage as compared with hand boring, on account of the time taken up in adjusting the stand and the accessory operation of laying railways and bringing up air and water pipes, and also because of the necessity of clearing away the whole of the rock blasted in one operation before beginning upon a new face, the author considers that there is an undoubted saving in time to be effected by the use of the machine. The most advantageous method of arranging the bore-holes is considered to be in four vertical lines about equal distances apart, but having the holes in the centre rows somewhat closer together than those at the side, there being six in each of the former series, and only four in the latter. By this arrangement, a uniform depth of 2·3 ft. being adopted as a standard, the stand only requires to be fixed twice for each set of 20 holes. The two central rows are loaded to a third of their depth with dynamite and fired first, making a deep notch in the face. This increases the effect of the side holes, which are fired subsequently with a somewhat smaller charge. Deep holes are not considered economical, as their effect is not found to be in proportion to the increased consumption of dynamite, besides being more uncertain than shallower ones. In conclusion, the author compares the results obtained with those of the St. Gothard Tunnel in 1873, when the drift at the Göschenen end was advanced, by six of Francois and Dubois' machines, 6·2 ft. per day, or 20·4 in. per machine; while at Schemnitz at the end of 1874 two of Sachs' machines drove at the rate of 3·4 feet per day, or 20·5 inches per machine. In the former cases 62·6 per cent. of the total depth of holes bored proved effective, while in the latter the proportion was 75·2 per cent., a result which the author attributes to the electric ignition, and the method of firing adopted. The cross sections of the two levels are, at St. Gothard 6·55 square feet, and at Schemnitz, 58 square feet.

—L. MARKUS, Oest. Zeitschrift für Berg und Hüttenwesen.—H. B., *in Proceedings of the London Institution of Civil Engineers.*

FOREIGN MINING AND METALLURGY.

The slightly upward tendency which had been noticed in French coal quotations has disappeared, and business has exhibited some depression upon the French coal markets. The mildness of the weather and the transport difficulties are assigned as the causes of the change. In the basins of the Nord and the Pas-de-Calais, as well as along the German frontier, the same depression is noted. In the basin of the Loire the situation has experienced no modification. The recent catastrophe in the Jabin Pit, and a loss of 30 lives in the No. 1 Escarpelle Pit, near Douai, continue to excite a good deal of comment. The Paris Chamber of Commerce has been again occupied with a project with a view to the establishment of direct navigable communication between the Mediterranean and the British Channel.

The quantity of phosphor contained in the ironstone in the vicinity of Essen is a great drawback to its use in the Bessemer steel manufacture, and necessitates the importation of 50 per cent. of the ore used from England, Spain, or Algeria. This, of course, considerably enhances the cost of production, and is a serious hindrance to the competition of German with English steel. A letter from Essen says that a cheap mode of getting rid of the phosphor from the iron ore and dross has just been discovered. If iron ore or dross containing phosphor be mixed with the appropriate alkali bases, as caustic potash, hydrate of soda, or sal-ammonaic, or with alkali salts, as potash, soda, common salt, &c., and the mixture be then heated, a phosphate salt which is soluble in slightly acidulated water is formed. The phosphor can thus be separated from the iron, as the latter is not soluble. The cheapest alkali salt is common salt. This discovery, says the writer quoted, seems likely to lower the cost of production in the German steel works in an important degree.

The Paris copper market has continued quiet, there has been comparatively little business doing, and prices have exhibited a downward tendency. Chilian, in bars, delivered at Havre, has made 83*l*.; ditto, ordinary descriptions, 82*l*.; ditto, in ingots, 87*l*.; English tough cake, 86*l*.; and pure Corocoro minerals, 84*l*. per ton. Upon the Marseilles market copper has continued feeble. The demand for copper has been a little more active upon the German markets, at the same time the requirements of consumption have been generally easily supplied, and the prices realised have not been very remunerative. Quotations for tin have been drooping at Paris, and there has been very little business doing in the article. Banca, delivered at Havre or Paris, has made 90*l*.; Straits, delivered at Havre or Paris, 83*l*.; and English, delivered at Havre or Rouen, 83*l*. per ton. The Marseilles tin market has exhibited weakness. The German tin markets have been colourless. There has been little movement in lead at Paris. French, delivered at Paris, has made 22*l*. 12s.; Spanish, delivered at Havre, 22*l*. 12s.; English, delivered at Havre, 22*l*. 16s.; and Belgian and German, delivered at Paris, 22*l*. 16s. per ton. There have been few variations upon the German lead markets. Silesian zinc, delivered at Havre, has been firmly maintained at Paris at 26*l*. 14s.; other good marks, delivered at Havre, at 26*l*. 10s.; and ditto, delivered at Paris, at 26*l*. 12s. per ton. Rolled Vieille-Montagne zinc has declined at Marseilles to 33*l*. 4s. per ton.

A little improvement is considered to have taken place in the French iron trade. Prices appear to have slightly hardened, and producers exhibit rather more confidence; purchasers also show somewhat more readiness to conclude transactions. German iron-masters have followed the example of their Belgian brethern, and have drawn the attention of the German Government to their almost desperate position. The Minister of Public Works has promised to accelerate railway works as much as possible, but it is doubtful whether such a measure will prove wholly efficacious. M. Jullien, the director of the Terre-Noire Works, has been appointed a member of the French Superior Council of Commerce; this council, it may be added, has just been convoked to consider questions relating to the removal of certain treaties of commerce between France and other nations.

Advices from Saarbruck state that navigations have scarcely yet been re-opened in that district, although a rather severe frost which had prevailed has broken up. During the closing of the navigations some rather important stocks accumulated. This increase of stocks, coupled with the feebleness of prices in neighbouring basins and the bad tone of almost all industries, and especially the iron trade, has induced the direction of the Saarbruck mines to rather materially reduce its tariff for coal. The reduced tariff will come into force this month (March). The extraction of coal in the Saarbruck basin in 1875 amounted to 5,109,320 tons, against 4,800,000 tons in 1874. Of the coal raised in the Saarbruck basin last year 3,445,600 tons went to Germany, 611,328 tons to France, 228,100 tons to Switzerland, 35,250 tons to the Luxembourg, and 4800 tons to Austria. The extraction of the Saarbruck basin in January this year amounted to 380,785 tons.

The winter season is now considered by the Belgian coal trade to have practically terminated, and the deliveries effected of late have been merely made in execution of old contracts, which are drawing to a close. Efforts are being made to secure new contracts, but it is difficult to conclude them in consequence of the absence of stability in prices. Hopes are entertained that some revival will be witnessed in Belgian metallurgical industry as the spring advances. Meanwhile it must be said that English and German coal holds Belgian coal in check upon the Belgian markets, and Belgian producers are obliged to make great concessions in order to conclude some current transactions. Navigations have been interrupted at several points in Belgium by floods. Some recent fire-damp disasters have attracted a good deal of attention in Belgium to the best means of preventing such calamities. The Kessales Colliery Company will pay, March 13, a second dividend for 1875 at the rate of 3*l*. 4s. per share.

Although a good deal of depression continues to prevail in the Belgian iron trade, a slight improvement in the tone of business has resulted from contracts having been let this week for the supply of a rather considerable quantity of new rolling stock to the Belgian State railways. Some of the Belgian works have been stopped in consequence of heavy floods; among the establishments which have suffered from this cause may be mentioned the works of the John Cockerill Company at Seraing, and the Esperance forges at Liége. A calculation which has been made in illustration of the progress of the manufacture of Bessemer steel in Austria states that there are now 30 converters, either in the course of construction or in actual operation in that country.

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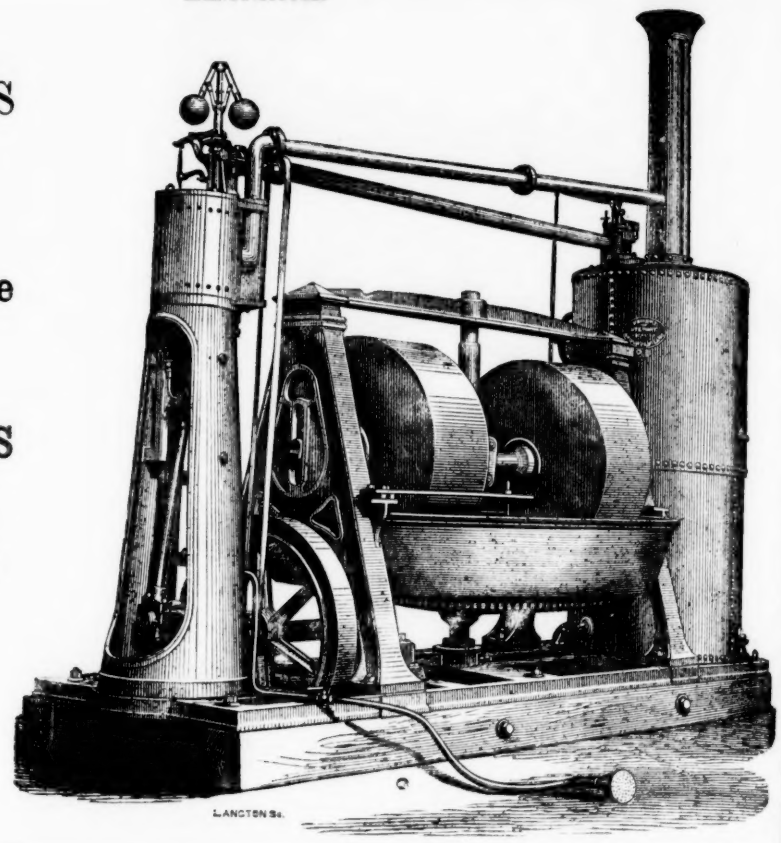

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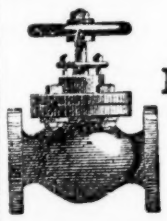

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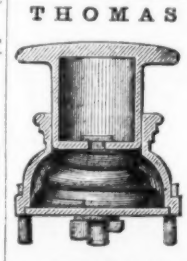

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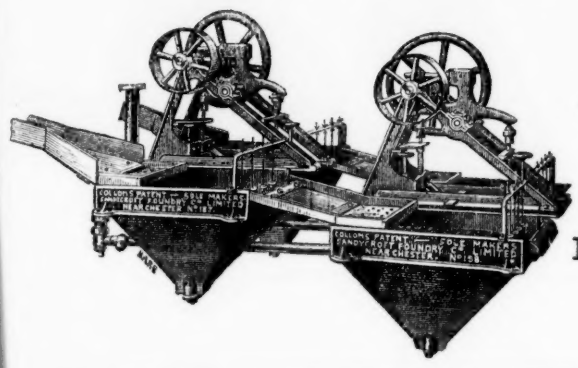

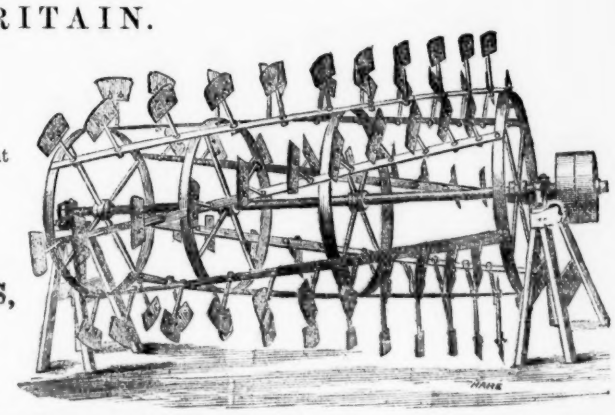

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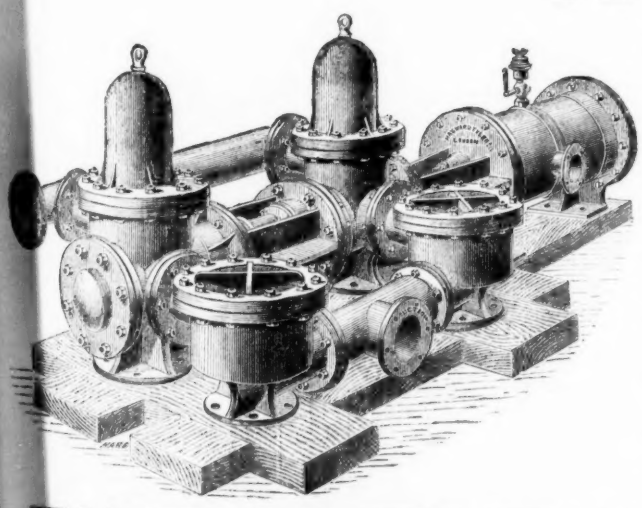

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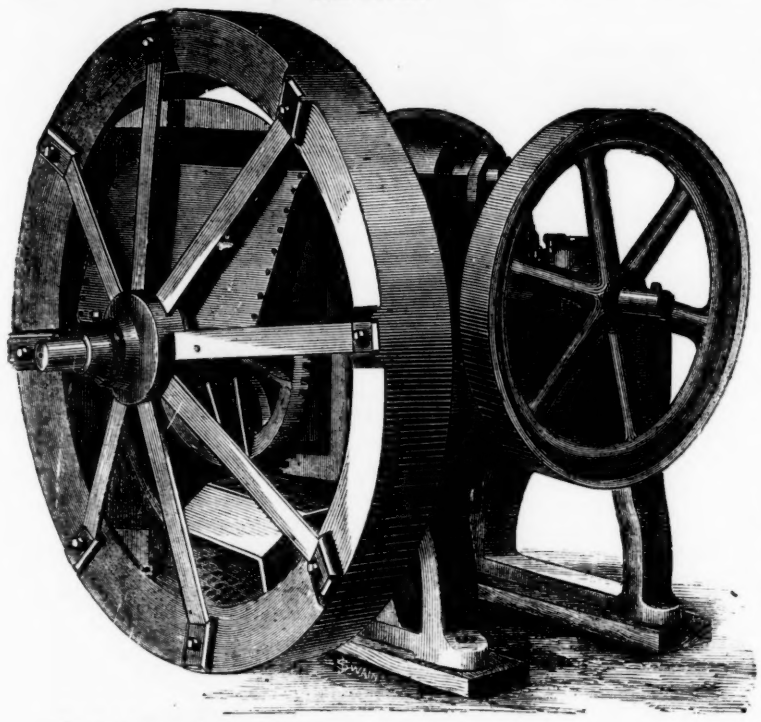

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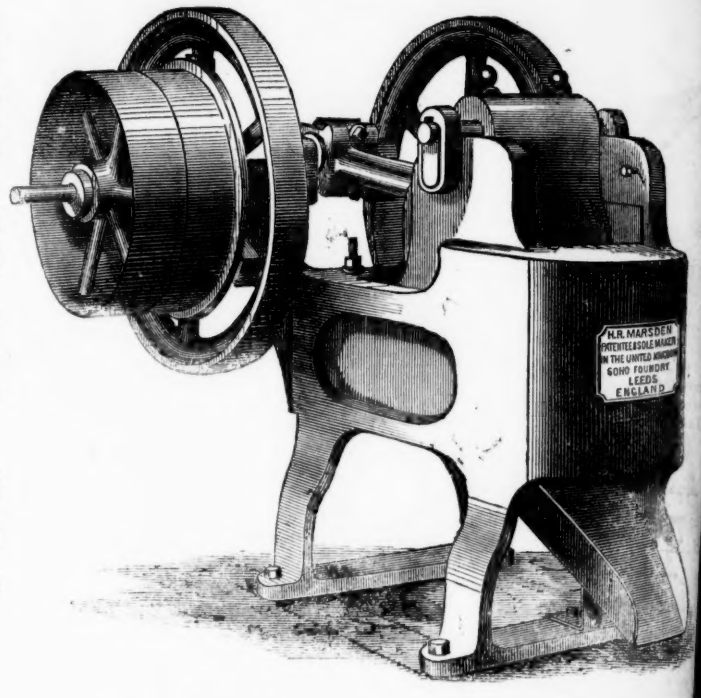

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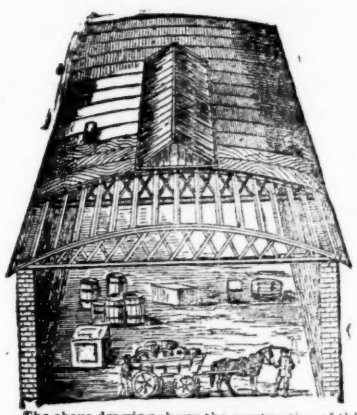

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4, PORTLAND STREET,
MANCHESTER;
OR
CORPORATION STREET,
BELFAST.

The above drawing shows the construction of this cheap and handsome roof, now much used for covering factories, stores, sheds farm buildings, &c., the principal of which are double bow and string girders of best pine timber, sheeted with ½ in. boards, supported on the girders by purlins running longitudinally, the whole being covered with patent waterproof roofing felt. These roofs so combine lightness with strength that they can be constructed up to 100 ft. span without centre supports, thus not only affording a clear wide space, but effecting a great saving both in the cost of roof and uprights.

They can be made with or without top-lights, ventilators, &c. Felt roofs of any description executed in accordance with plans. Prices for plain roofs from 30s. to 80s. per square, according to span, size, and situation.

Manufacturers of PATENT FELTED SHEATHING, for covering ships' bottoms under copper or zinc.

INODOROUS FELT for lining damp walls and under floor cloths.

DRY HAIR FELT, for deadening sound and for covering steam pipes, thereby saving 25 per cent. in fuel by preventing the radiation of heat.

PATENT ASPHALTE ROOFING FELT, price 1d. per square foot.

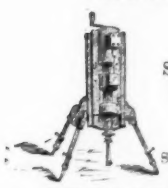
Wholesale buyers and exporters allowed liberal discounts.

PATENT ROOFING VARNISH, in boxes from 3 gallons to any quantity required 8d. per gallon.

DUNN'S ROCK DRILL,

AND

AIR COMPRESSORS.



DRIVING BED ROCK TUNNELS, SINKING SHAFTS, AND PERFORMING OPEN FIELD OPERATIONS,

IS THE

CHEAPEST, SIMPLEST, STRONGEST, & MOST EFFECTIVE DRILL IN THE WORLD.

OFFICE,—193, GOSWELL ROAD

(W. W. DUNN AND CO.),

LONDON, E.C.

HEPBURN'S

PUMP LEATHER

WATERPROOF

By a special method of preparation, this leather is made solid, perfectly close in texture, and impermeable to water; it has, therefore, all the qualifications essential for pump buckets, and is the most durable material of which they can be made. It may be had of all dealers in leather, and of—

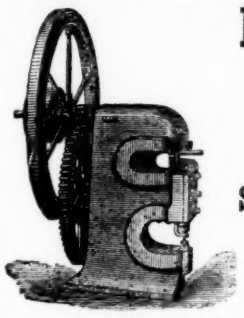
I. AND T. HEPBURN AND SONS,

TANNERS AND CURRIERS, LEATHER MILLBAND AND HOSE PIPE MANUFACTURERS,

LONG LANE, SOUTHWARK, LONDON

Prize Medals, 1851, 1855, 1862, for

MILL BANDS, HOSE, AND LEATHER FOR MACHINERY PURPOSES.

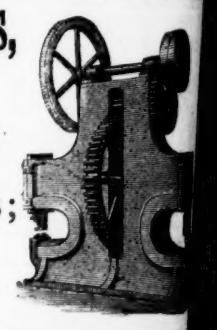


PUNCHING & SHEARING MACHINES,

Suitable for Collieries, Shipbuilders, Boiler Makers, Ironworks, &c.

Self-acting, Slide, and Screw-cutting Lathes;
Slotting Machines; Shaping Machines;
Drilling, Planing, and Screwing Machines;

And Miscellaneous Tools of every kind always in Stock.

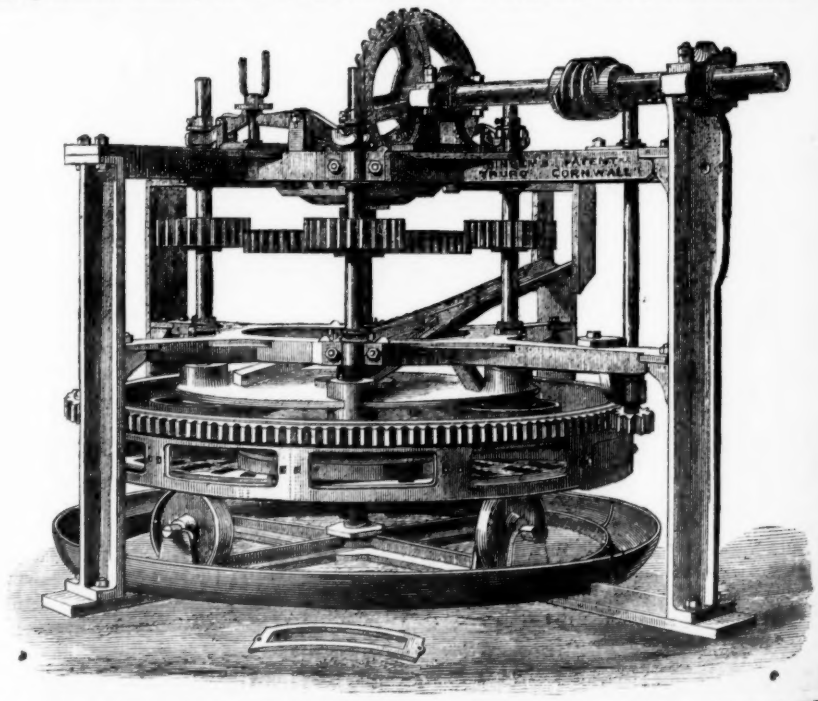


J. GOODWORTH, KIRKSTALL ROAD, LEEDS.

DINGEY'S PATENT PULVERISER.

First Silver Medal, Royal Cornwall Polytechnic Society, awarded 1870.

Special Premium of £20, offered conjointly by the Editor of "Mining Journal" and the Royal Cornwall Polytechnic Society for the Best Invention for Dressing Ores, awarded 1872.



This Machine is specially adapted for GRINDING TIN ROWS, LEAD SKIMPINGS, GOLD and SILVER ORES, &c. CLASS MINERAL ORES can be treated by this Machine that would not pay by any other treatment.

This Pulveriser is working at Carn Brea, Tincroft, Wheal Jane, Frank Mills (Lead), and various other Mines.

TESTIMONIALS.

From Capt. WM. TEAGUE, Jan. 31, 1876, Manager of Tincroft Mines, Redruth.

I have used Dingey's Patent Pulverisers for some time, and am pleased to say they answer to my entire satisfaction; it is, therefore, with great pleasure I commend them to any party who may want machines for reducing sand almost to a pulp.

From Capt. JOHN NICHOLLS, Frank Mills (Lead) Mine, Christow, near Exeter, Jan. 4, 1876.

The Pulveriser answers admirably, and we are satisfied it is the most efficient Machine extant for treating halvans, &c. Please send on the other two as soon as possible.

Address, for price, &c.—

FRANCIS DINGEY & SON, Truro Foundry, Truro, Cornwall

N.B.—MINING MACHINERY OR CASTINGS OF ALL DESCRIPTIONS SUPPLIED.

Printed by RICHARD MIDDLETON, and published by HENRY ENGLISH (the proprietors) at their offices, 26, FLEET STREET, E.C., where all communications are requested to be addressed.—March 4, 1876.